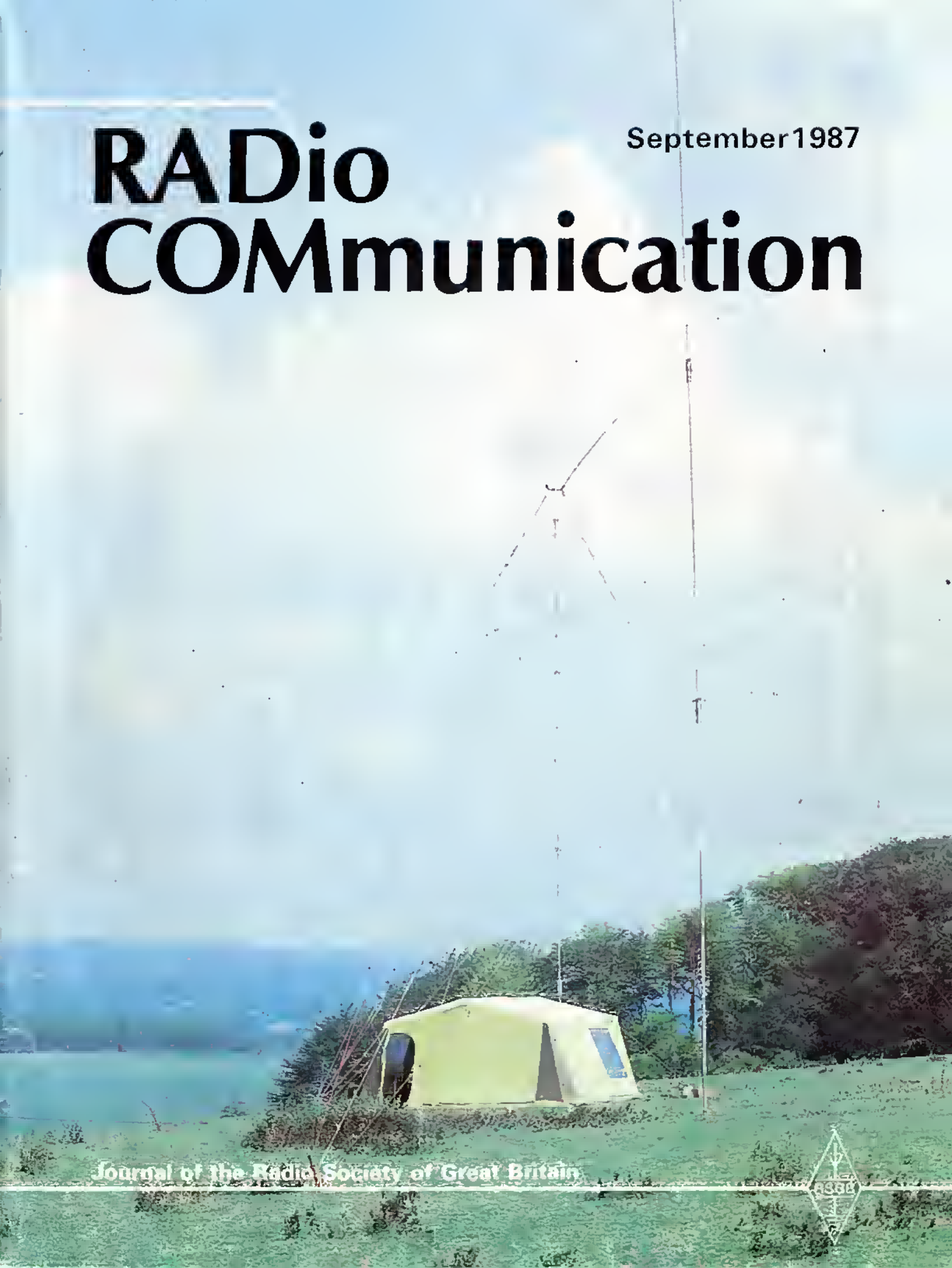


# RADio COMmunication

September 1987



Journal of the Radio Society of Great Britain



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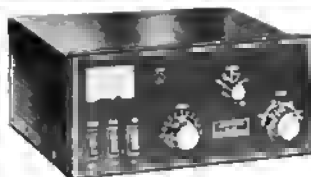
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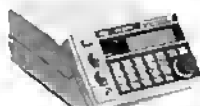
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Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

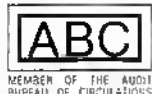
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The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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### FRONT COVER

National HF Field Day station of  
G3KLH/P located near Salisbury in  
1982. Photo: G3RVM



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## two great handhelds from KENWOOD.

Without a doubt the two new 2 metre FM hand-helds from KENWOOD now represent the best value for money in amateur radio equipment today.

For the amateur who wants a simple high quality transceiver from a reputable manufacturer at a rock bottom price but still wants high output power for shack use, the TH205E is the answer. And for the operator who is prepared to pay a little more to gain additional features, the TH215E is the obvious choice. As well as the new rigs for 2 metres, KENWOOD have produced 70 centimetre versions, these are the TH405E and TH415E.

	TH205E	TH215E
<b>Frequency range</b>	144 to 146 MHz for both receivers	
<b>Power output</b>	Depending on operating voltage up to 5 watts (with standard PB2 battery pack 2.5 watts)	
<b>Operating voltage</b>	Battery terminal 6.3 to 15 volts DC Top panel jack 7.2 to 16 volts DC	
<b>Memory channels</b>	3 with quick recall	10 with quick recall
<b>Frequency stepping</b>	5 kHz	5, 10, 15, 20 or 25 kHz
<b>Battery saver</b>	Built-in battery saver extends operating life	
<b>Scan</b>	Simple band scan	Band, memory and programmable scan
<b>Size</b>	67(2.64)W x 173(6.81)H x 37(1.46)D mm(in.)	
<b>Weight</b>	520 g (1.15 lb) with PB2 and aerial	



## TW-4100E

Using the latest in technology, the designers of the TW4100E dual band FM mobile transceiver have achieved increased performance and, at the same time, made operation even easier. The operator can pre-set the transceiver according to the band plan and his preferences. Options available are shift (+, - or duplex), frequency stepping (5, 10, 12.5, 20, 25 or 50 KHz) and repeater shift (500 KHz, 1.6 S, and 7.6 MHz).

With the KENWOOD TW4100E, not only do you have the normal simplex and repeater modes but crossband duplex as well. Priority channel monitoring takes on a new meaning if the full audio can be heard whilst you are transmitting instead of the usual "bleep" and loss of signal. If you work another amateur who can also simultaneously transmit on one band and listen on the other, and many stations do have this facility, then a telephone style conversation is possible. Anyone who has not experienced duplex operating will soon come to prefer the natural conversation style that is possible.

With the high level of traffic on today's roads, it is essential that a mobile transceiver is easy to

operate. KENWOOD engineers have simplified the rig's operation by providing ten memories, each of which will hold information on frequency, simplex or repeater operation and whether or not the tone burst is on or off. By pushing a single button all this information can be transferred to the VFO. Of course the original information is still held in memory for future use. You therefore have ten independent VFOs. KENWOOD's attention to detail is shown by the following additional facility. If having transferred a repeater frequency to the VFO, you move onto an adjacent simplex channel, you can, by the push of two buttons, cancel the tone burst and reset the shift from repeater to simplex. Of course, two more presses of the same buttons restore the facilities.

Linear amplifiers are not needed with the KENWOOD TW4100E! Power output from the transceiver is 45 watts on two metres and 35 watts on seventy centimetres, more than enough to cope with difficult terrain.

The TW4100E has another facility not mentioned in the handbook. Not mentioned because unless you are a RAYNET member on an approved

operation or engaged on a real emergency, to use the equipment in such a way is outside the compass of the licence as we presently know it.

The facility is that the TW4100E will act as a private crossband repeater. This means that you can park your car in a decent location and wander off into an RF black spot. Armed with a small low power handheld, you can talk back to the TW4100E which, since you tell it, has been constantly checking the two pre-set crossband frequencies. Your transmission is received and simultaneously transmitted by the TW4100E on the other band. When a station replies, the message is again simultaneously retransmitted to you. Of course you need to have another amateur in your car to oversee the operation and it must be a recognised RAYNET use. In repeater mode the KENWOOD TW4100E has automatic time-out after approximately three minutes.

The TW4100E has provision for DCL (digital channel link) and DCS (digital code squelch) when the optional MUI board is fitted.

TW4100E... £699.00 inc vat, carriage £7.00.

## LOWE ELECTRONICS LTD.

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# the KENWOOD **TS530SP** HF transceiver, a sensible rig.

The TRIO TS530SP HF transceiver is similar to the TS830S in that it also uses a pair of 6146B valves in its PA stage. The transceiver has been designed for the amateur who has no need for the additional facilities that are part of the TS830S but who still requires a high level of performance from his equipment.

The TRIO TS530SP covers the amateur bands from 160 through to 10 metres. Modes of operation are USB, LSB and CW.

Operating from 240 volts AC the transceiver has its own internal power supply.

IF shift is built into the TS530SP to allow the IF passband to be moved around the received signal and away from interfering signals and sideband splatter. Even greater selectivity is achieved when an optional YK88SN (1.8 kHz), YK88C (500 Hz) or YK88CN (270 Hz) filter is installed.

A turnable notch filter is built into the audio circuit of the TS530SP.

The speech processor in the TS530SP combines an audio compression amplifier with a change of ALC time constant for extra audio punch and increased average SSB output.

To cope with pulse type noise (such as ignition), the transceiver has a noise blanker.

Both RIT and XIT (receiver as well as transmitter incremental tuning) are included to aid operating, XIT being a distinct advantage when calling a station that is listening "off frequency".

TS530SP HF transceiver ..... £927.51 inc vat, carriage £7.00.

TS830S (Big brother) ..... £1098.00 inc vat, carriage £7.00.



# FREE

Send only £1 to cover postage and packing and we will send you, by return, a FREE copy of the new full colour KENWOOD catalogue which lists the features and specification of every model and accessory currently available. We will also include, FREE OF CHARGE, a copy of our general catalogue which, along with items to enhance your operating, contains much useful information. Finally, to cheer you up, we will add the latest edition of our price list.



**TS940S** ... Top of the range, the TS940S has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM, FSK and FM. Forty memory channels, each effectively a separate VFO and easy keyboard frequency entry make operation and ownership of the TRIO TS940S a pleasure.

TS940S ... £1995.00 inc vat, carriage £7.00.



**TS930S** ... Much has been said and written about the TS930S and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the TRIO TS930S is the ideal rig for today's crowded bands.

TS930S ... £1695.00 inc vat, carriage £7.00.



**TS440S** ... A step forward in compact HF equipment, the TS440S covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.

TS440S ... £1138.81 inc vat, carriage £7.00.



**TS430S** ... A compact HF transceiver suitable for mobile or portable operation, yet having all the facilities necessary for effective radio communication. The TS430S covers the amateur bands from 160 to 10 metres and is a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM with FM optional.

TS430S ... £974.23 inc vat, carriage £7.00.

All prices subject to confirmation

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NS448 with remote head. . . 900 to 1300 MHz, forward 5/60 W, reflected 1.5/6.6 W, N type connectors. . . £86.60 inc vat, carriage £2.50.

CN410M

NS660P

NS448

CN460M

NS660P with switchable motor reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors. . . £115.00 inc vat, carriage £2.50.  
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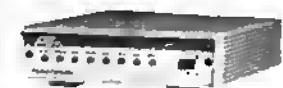
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Whilst many manufacturers continue to sell clones of the TNC2, AEA has improved on the TNC2 program with several new software features. The Host mode of the new PK-87 Packet Controller can be utilized to improve terminal program operation. Four new commands in the PK-87 allow you to restrict the use of your station for both connects and as a digipeater. The Mailbox monitoring command allows monitoring without displaying the call sign headers. While the PK-87 can be used for HF operation, AEA recommends the optional PM-1 packet modem for low band use. In addition to standard Data Carrier Detect, Push to talk, Status, and Connect indicators, the PK-87 has front panel LEDs for operational mode (Converse, Transmit, Command) and multiple connects.



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### COMPANY BACKGROUND

ICS are the official importers of AEA equipment for the whole of Europe. We also produce our own equipment in the U.K. for export worldwide. Our radio data communications systems are in use in every continent and most major countries of the world. (Yes, even Japan), and are used in applications as diverse as round the world yachting; a world wide data communications network for the Red Cross; oil prospecting in Western Australia; diving operations in the Red Sea, and financial data transmission within the City of London – to name but a few.

ICS were the first company in the world to sell a commercial, packaged AMTOR system; the first company in the U.K. to sell commercial packet radio equipment, and the first company in the U.K. to introduce a low cost weather facsimile unit for amateur and marine use.

This autumn, we are introducing improvements to two existing products: FAX transceiver becomes standard on the PK-232, and RTTY reception and a double screened printer cable become standard parts of our FAX-1 package. Soon, we will also be introducing a NAVTEX weather and navigation warning receive option for the FAX-1.

Later this autumn, ICS WILL LAUNCH THE AMT-3: A dedicated AMTOR/SITOR unit for commercial and marine markets – or for the amateur who simply wants the best AMTOR unit available. ICS is expanding with the addition of further space and more full time staff to better serve you, our customers. Despite growing commercial activities, the amateur radio market continues to represent by far the majority of our sales. We are dedicated to serve and support the amateur market in the future, with new and improved products. Watch this space!

#### DEDICATED RADIO FACSIMILE EQUIPMENT

FAX-1	Radio Facsimile Weather Map	PRICE	P & P & Ins
	Demodulator with double screened printer cable.	£329.95	£3.50
	Includes mounting bracket and new RTTY receive facility		
FAX-1B	Brother M1109 printer with paper roll holder	£269.95	£3.50
HF-125	Synthesised HF Receiver, suitable for FAX reception	£375.00	£4.00
PPP-60	60 Watt DC/AC Adaptor	£55.00	£2.00
Marine Installation kit, comprising:		£29.95	£2.00
BMP-1	Bulkhead mounting plate for FAX-1B		
RAC-1	Printer remote relay control unit		

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Visitors by appointment only. Prices may vary according to prevailing exchange rates.  
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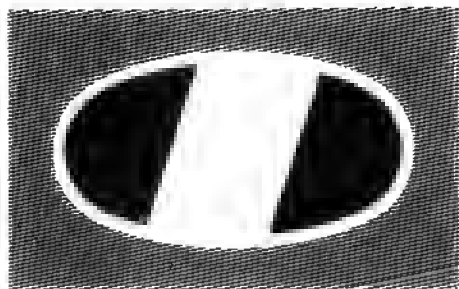


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# 'Tech Talk' from



# ICOM

Reduced size yet high performance HF antennas are becoming increasingly popular among today's radio amateurs, and ICOM is proudly responding to those needs with a deluxe antenna system. The AH-2. This all band and fully automatic antenna package is especially designed for luxury style mobile/portable activities such as vacations or operating from environmentally sensitive areas such as apartments.

Mobile in top fashion hasn't been more attractive, and ICOM's 'all in one' design boasts numerous advantages over conventional 'mixed components' type setups. Whether pursuing fixed station or mobile activities, the flexibility and convenience of this fully remote controlled and automatically tuned antenna opens new horizons in limited antenna HF operations. Since the AH-2 system is packed with unique features and is a relatively new idea, we would like to discuss its innovative designs in a step-by-step manner.

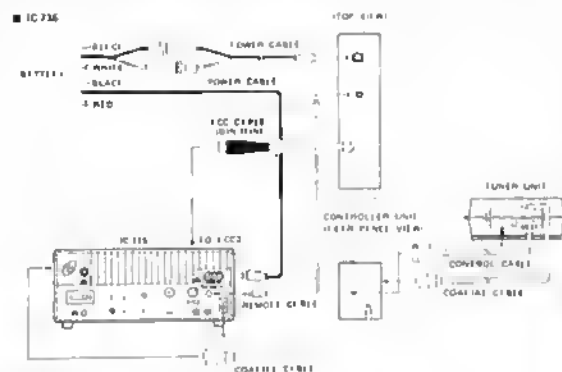
There are five components in the ICOM AH-2 system. The package can be purchased complete or minus the mobile mount and whip for auto/fixed station use as desired. The full system consists of a small rig attached control unit, a remote actuated and microprocessor controlled antenna tuning unit, an approximate nine-foot stainless steel whip, a universal and heavy duty auto frame mount and an interconnecting cable set.

An optional OPC 137 cable interface is available for the IC 751 or IC 745 HF transceivers. When using the system's stainless whip, operation on all amateur bands between 3.5 and 30 MHz is possible. When the radiating whip is replaced with a random wire 40 feet or longer 1.8 MHz operation is also possible. During operation, you merely select a band and frequency, push the remote unit's 'tune' button, and one of over 260,000 LC combinations is digitally selected for optimum transmit antenna performance. Tuning actions require only ten waits of RF power, and the resulting SWR is 1.5:1. Usual tuning time is less than six seconds. The antenna tuning unit's microprocessor stores that LC data in one of eight internal memories, so that information is recalled in less than two seconds when the HF transceiver returns a preselected range. An additional microprocessor in the rig attached remote control unit handles automatic transceiver tune mode switching and RF power output control.

Notice the inner capabilities are used during both transmit and receive. Its four sensors (impedance, phase, forward and reflected power) are designed to optimize both single longwires and whips of random wires shorter than  $\frac{1}{4}$  wavelength, a difficult task for many automatic tuners. Notice also the precise use of microprocessor selected fixed capacitors rather than motor driven variables. This overall concept provides superb antenna tuning and the highest possible performance.

The system's whip and mount truly gives new clarity to the terms 'universal' and 'heavy duty'. They can be quickly installed on a TV mast, boat or car. The mount's bracket bolts to an existing hole in an auto's rear frame, a very strong pipe bolts into the bracket, and the antenna's base section bolts to the pipe's remaining end. The pipe's length is fully adjustable to fit various cars. The antenna base section, incidentally, stands 15 inches tall and weighs approximately nine pounds. Rugged, sturdy and understatement.

Whether assembled as an all band mobile system or employed in fixed station use, when large arrays are unfeasible, ICOM's dual microprocessor controlled AH-2 will keep you communicating in high style. ICOM is bridging new areas in communications and wants you to enjoy this leading edge in modern technology.



## IC-AH2 Mobile Antenna System.



Telephone us free-of-charge on:

**HELPLINE 0800-521145.**

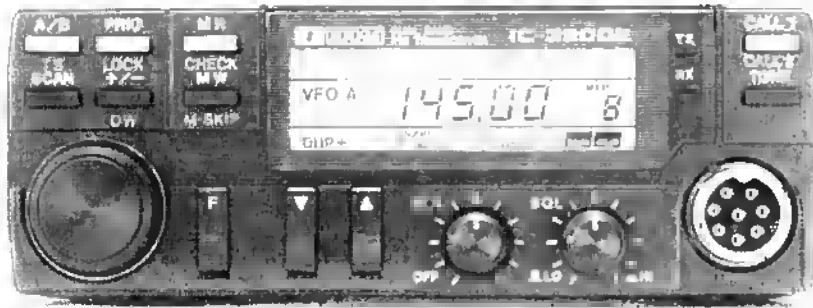
Mon-Fri 09:00-11:00 and 1400-17:30

This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for special enquiries and parts orders. Thank you.





## IC-3200E, Dual-band transceiver.



If you are a newly licensed or just undecided about which band to first operate, then the ICOM IC-3200E is just the answer. This is a dual-band (144-146/430-440MHz) F.M. transceiver ideally suited for the mobile operator. The IC-3200E has a built in duplexer and can operate on one antenna for both VHF and UHF, and with 25 watts of

output power on both bands (the low power can be adjusted from 1 to 10 watts) you can never be far from a contact whether simplex or 2m/70cm repeater.

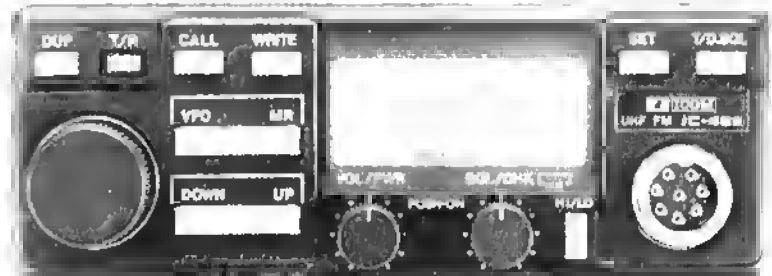
The IC-3200E employs a function key for low priority operations to simplify the front panel and a new LCD display which is easy to read in bright sunlight, 10 memory channels will show operating frequencies simplex or duplex, and four scanning systems memory, band, program and priority scan.

## IC-48E, 70cm. FM Mini-mobile.

This NEW 70cm. band transceiver is so small that it will fit almost anywhere in your vehicle or shack. Power output is 25 watts or 5 watts low, the IC-48E is supplied complete with an internal loud-speaker. The large front panel LCD readout is designed for wide-angle viewing with an automatic dimmer circuit to control the back lighting of the display for day or night operating. The front panel of the IC-48E is straightforward to make mobile operation safe and easy. The IC-48E contains 21 memory channels with duplex and memory skip functions. All memories and frequencies can be scanned by using the HM15 hand mic provided.

IC-48E options include the PS45 13.8V. 8 amp power supply, SP8 and SP10 external loudspeakers. HS15/SB mobile flexible microphone and PTT switchbox.

Why not try 70 cms as a serious alternative to the 2 metre band, you might be amazed at what can be achieved. For more information contact us or your local ICOM dealer.



ICOM have introduced a range of test meters for the radio amateur. These new models would be a useful addition to any ham shack. The DM10 is a digital pen type volt/resistance meter. The LCD display shows measurement in the range, D.C. volts 0.1mV-500V, A.C. volts 1mV-500V. Resistance 0.1ohm-20M ohm. Its small size (21W x 31H x 161L) makes it an ideal handheld test meter.

The DM20 is a digital pocket type volt/resistance meter. The large LCD display shows measurement in A.C. and D.C. volts 1mV-450V, and resistance 0.1 ohm-200K ohms. This test meter is ideal for portable use, its size (51W x 106H x 10D) making it a useful piece of equipment to carry in your pocket.

The DM500 is the top of the range digital meter. The large LCD display shows measurements in the range, D.C. volts 0.1mV-1000V, A.C. volts 1mV-750V. Resistance 0.1 ohm-20M ohms. DC current 0.1uA-10A. This meter measures 70W x 14H x 34D and is ideal to cope with most applications in your radio shack.



## ICOM TEST METERS



# MOBILE MASTERPIECES

## IC-900 Super Multiband FM System.

This new addition to ICOM's Ham radio equipment is a multiband FM transceiver system that allows the mobile operator to customize a communications system for his favourite bands. Up to 5 optional band-units can be installed with the IC-900 for instant access to a wide range of frequencies from the 28MHz HF band to the 1240MHz UHF band. Only a small remote controller is necessary for control of all these bands. A flexible optical fibre is used between the Remote Controller and the Interface Unit. The IC-900 has independent, full duplex capability on all bands, providing simultaneous receive and transmit operation.

The function display on the Remote Controller shows two separate operating frequencies simultaneously. The IC-900 system transceiver is equipped with 10 fully programmable memory channels in each Band Unit. The system can therefore store up to 50 different memory channels.

This revolutionary new concept in Multiband operation is available from your ICOM dealer. Also feel free to contact ICOM (UK) LTD for assistance or information. The IC-900 Multi-band system consists of a Remote Controller, Interface Unit A, Interface Unit B and a series of specially designed Band Units.

UX19	28—30MHz	10 watts
*UX59	50—54MHz	10 watts
*(No mobile operation allowed in UK)		
UX29	144—146MHz	25 watts
UX29H	144—146MHz	45 watts
UX49	430—440MHz	25 watts
UX129	1240—1300MHz	10 watts

## IC-1200, 23cms FM Mobile.

To complete the range of VHF/UHF FM Mobiles this new model is now available for the 23cm Ham band, it is based on similar features to the already existing IC-28E 2m and IC-4BE 70 cms mobile units. This Mini-mobile transceiver will fit easily anywhere in your vehicle or shack. Power output is 10 watts or 1 watt low. The IC-1200 is so new we do not even have a picture of it, however, the large front panel LCD readout is designed for wide angle viewing and front panel controls are straightforward to make mobile operation safe and easy. The IC-1200 is a superb example of ICOM's dedication to exploring new communication equipment.



# Where to find **ICOM** in the U.K.

You can find ICOM Amateur radio in use throughout the world. Here in the U.K. ICOM is available from an extensive dealer network across the country. Just visit your local emporium and you will probably find that they are ICOM dealers. Authorised ICOM dealers will provide information on the entire ICOM range of Amateur equipment backed-up with good after-sales service.

If you are a licensed Amateur or short wave listener ICOM have a complete product range from HF to Microwaves to suit your needs. Should you have difficulty in locating your nearest ICOM stockist contact us at the address shown at the bottom of this page.

<b>Avon</b> Booth Holding (Bath) Ltd., Bristol	02217-2402	<b>Glamorgan</b> Transworld Comms (Neath) Ltd	0639-52374	<b>Nottingham</b> R A S. Nottingham	0602-280267
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<b>Cheshire</b> Hobbytronics, Knutsford	0565-4040	<b>Lancashire</b> D.W. Electronics, Widnes. Video Electronics, Morecambe.	051-420-2559 0524-418873	<b>Warwickshire</b> A J H Electronics, Rugby	0788 76473
<b>Clwyd</b> SMC (TMP), Buckley.	0244-549563	<b>London</b> Amcomm Services Ltd., Acton Dressler (UK) Ltd., Leyton. Radio Shack Ltd., W. Hampstead	01-992-5765 01-598 0854 01-624-7174	<b>West Midlands</b> Ray Withers, Warley	021-421-8201
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CN410M 3-5-150MHz swr £54.00  
CN460M 140-500MHz swr £58.00  
HP4A High Pass Filter £8.25  
AT1000 SWL ATU £70.00  
HK608 Morse key £20.15  
Lightweight Antenna Rotator £52.50  
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Daiwa 30 Amp Power Supply £200.00  
Pali 7, 1MHz Antenna Traps £10.50  
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Half size G5RV antenna £16.25  
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Updated version of the best selling scanning receiver the AR2001. Frequency range 25 to 550MHz plus new band B00 to 1300MHz. Improved keyboard. Front panel knob for frequency stepping LED "S" Meter. Socket for RS232 interface unit. Specifications as the AR2001. PRICE £487.30



TS430S HF Transceiver

## ANTENNAS

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Jaybeam VR3 Vertical £70.00  
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Jaybeam TB3 Tri-band £299.00  
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+ CUE DEE

## THE ULTIMATE PARTNERSHIP

With the recent surge in interest in the lower VHF bands the average amateur is looking around for new equipment on these bands. In what promises to be the ultimate partnership BNOS have teamed up with Cue Dee of Sweden to offer the highest quality equipment available anywhere.

BNOS, of course, have always offered a five year guarantee on all our linear amplifiers and the 4m/6m range is no exception. The compact LP models for 6 metres incorporate many of our popular features which offer peace of mind to the user. The LPM models for both bands contain all of our user friendly additions including the power meter and our famous overdrive protection circuits.



	LP50-3-50	LP50-10-50	LPM50-10-100	LPM70-10-100
Frequency Range	50-54MHz	50-54MHz	50-54MHz	70-72MHz
Class of Operation	AB1	AB1	AB1	AB1
Minimum input power	500mW	500mW	500mW	500mW
Maximum input power	5W	15W	15W	15W
Recommended input power	3W	10W	10W	10W
Output impedance	50 ohms	50 ohms	50 ohms	50 ohms
Output Power	50W	50W	100W	100W
Power Requirements	13-8V 6A	13-8V 6A	13-8V 12A	13-8V 12A
Pro-Amp gain (typical)	12dB	12dB	12dB	12dB
Noise Figure (Better than)	1.5dB	1.5dB	1.0dB	1.0dB

next time there's a stateside opening on 6, you can rest assured that the bloke next door can still listen to "The Archers".

Cue Dee are the Aerial world's BNOS. They also can offer a five year guarantee on their products because of the superior construction of their antennae. The aeriels are made from the finest Aluminium and tested to Sweden's stringent national regulations.

The Cue Dee Duo is a combined yagi with 5 elements on 4 metres and 6 on 6 metres. The Duo incorporates a factory

As is usual with BNOS products the specifications mean what they say. Power is quoted in RMS and harmonic outputs are kept incredibly low.

Many black boxes produce terrible second and third harmonics and at six metres these harmonics are even more troublesome. The second harmonic of 50 MHz is slap bang in the middle of the broadcast FM band. BNOS's range of low pass filters are designed to remove harmonic problems without cutting out the DX too. Fit a BNOS filter and the

Model	Band MHz	Insertion Loss dB	Harmonic 2nd	Rejection 3rd	Non Harmonic Rejection	Power Handling	Connectors
F50-L/U	50	Better than 0.5	50dB	75dB	75dB	250W	UHF
F70-L/U	70	Better than 0.5	50dB	75dB	75dB	250W	UHF
F144-L/U	144	Better than 0.5	50dB	75dB	75dB	250W	UHF
F144-L/N	144	Better than 0.5	50dB	75dB	75dB	250W	N
F432-L/N	432	Better than 0.5	50dB	75dB	75dB	250W	N

Note: Rejection Figures are typical and w.r.t. the wanted signal

### 6 metre Amps

LP50-3-50 Linear/Preamp	175.00
LP50-10-55 Linear/Preamp	175.00
LPM50-10-100 Linear/Preamp	235.00

### Filters

F50-L/U	29.95
F70-L/U	29.95
F144-L/U	29.95
F144-L/N	35.35
F432-L/N	35.35

### 4 metre Amps

LPM70-10-100 Linear/Preamp	235.00
----------------------------	--------

CUE DEE Duo Antenna 5 elle on 4m & 6 elle on 6m 6dBd on both bands 129.95



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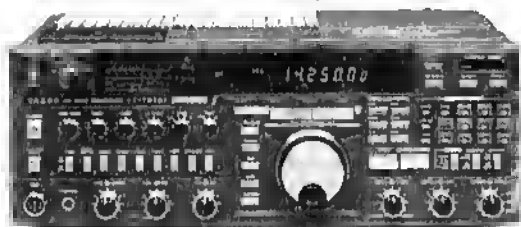


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### OPTIONAL ACCESSORIES

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**£969.00 inc VAT. RRP.**

### ANTENNAS & ACCESSORIES

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HK804	de Luxe Brass Key	£101.99 £2.00

MORSE EQUIPMENT		
KP100	Squeeze 230/13.8V	£109.25 £2.00
KP200	Memory 4096 Mult Ch	£234.55 £2.50
	Mem Back Up 230/13.8V	
O70	Morse Tutor (Dalong)	£56.35 FOC
MM51	Morse Tutor (M/M)	£129.95 FOC
NMS2	Morse Tutor Advanced	£168.82 FOC

MICROWAVE MODULES—RTTY EQUIPMENT		
MM1001	RTTY to Video	£188.83 FOC
MM1001KB	Morse Keyboard	£135.00 FOC

DATA TERMINALS		
IONO 5000C	Data Terminal c/w Keyboard & VDU	£1029.00
PK232/FAX	Multimode Data Terminal CW, RTTY, AMTOR, FAX	£289.95

## SATELLITE TELEVISION



SMC have been searching the world for the best in Satellite T.V. equipment and we believe our system is amongst the best available in the U.K. at present. We will be pleased to advise you on the best type of system to purchase for your location as reception varies throughout the U.K. so contact us for the best advice on a complete system for you.

- Dishes
  - LNB (Low Noise Box)
  - Receiver/Converter
  - Motor Drive for Dish
  - System 1
  - 1.2 mtr dish, offset fibreglass c/w polemount and tripod stand
  - Feed horn
  - LNB
  - SR7000 Remote control receiver
  - 2 x 'F' to 'N' adapters
  - 2 x UG21 N plugs
  - System 1 price £861.35p inc VAT
  - System 2
  - As system 1 but 1.6 mtr Dish
  - System 2 price £891.25p inc VAT
  - System 3
  - As system 1 except + Scaler ring feed + 18" Jack Olive & Controller
  - System 3 price £1148.85p inc VAT
- N.B. Systems 1 & 2 require length H100 feeder.  
System 3 requires length H100 & RC2W.  
(Not included in system price).

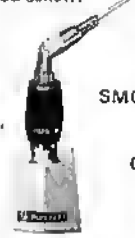
## Oscar VHF/UHF

### HF, VHF, UHF ANTENNAS MOBILE VERTICALS

SMC-HS Mobile Elements, telescoped below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal—band changes, comparative test, car wash, anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fixed askew.



SMC 78F



SMC258

GCD

GCD

SMC-HS MOBILE ANTENNAS			£	P&P
5MC6P2T/PL	Telescopic 2M PL259 fitting	1A	6.33	0.85
5MCT144B	Telescopic 2M 1 wave BNC	1A	13.50	0.85
5MC6P2T/	Telescopic 2M BNC fitting 1A		7.94	0.85
5MC2H/PL	Helical 2M PL259 fitting		8.33	0.85
5MC2H/BNC	Helical 2M BNC fitting		7.94	0.85
SMCH5430S	70cm 1 wave BNC 2.5dB		9.75	0.85
SMC20W	2M 1 wave 0dB 1.6'		3.15	1.85
SMC25E	2M 1 wave 3.0dB		13.95	2.00
SMC2VF	2M 1 wave fold 3.0dB 3.5'		16.13	2.00
SMC78F	2M 1 wave fold 4.5dB 5.7'		23.95	2.50
SMC78B	2M 1 wave ball 4.5dB 5.6'		23.95	2.50
SMC78SF	2M 1 wave short 4.7'		22.95	2.50
SMC88F	2M 8/8 wave 5.2dB 6.5'		24.10	2.50
SMC258	70cm 2 x 1 fold 5.5dB 3.1'		29.37	2.00
SMC268E	70cm 2 section collar 8dB		32.80	2.00
SMC35B	70cm 3 x 1 fold 3.0dB 4.7'		33.73	2.00
SMC70N2M	Quad band 2M 70cm		24.95	2.00
70N2DX	Dual Band 2m & 70cms		37.75	2.00
725M	Dual Band 2m & 70cms		11.35	2.00
SMCH5770	144/432 Output 50W		24.95	1.85
SMC155E	15M 1.72M 130W PEP		16.85	2.50
SMC10SE	10M 1.72M 200W PEP		15.95	2.50
SMC175E	17M 1.915M 200W PEP		18.75	2.50
SMC12SE	12M 1.915M 200W PEP		16.85	2.50
RSL 28B	Yacht 10M mobile whip		8.50	2.00
SMCGCA	Gutter clip 4 mtrs cable		14.25	2.00
SMCSOCA	Cable assembly 4M PL259		6.90	1.50
SMCSOCAL	Cable assembly 6M PL259		7.20	1.50
SMCSOCALLR	Cable assembly 5M PL259		6.60	1.50
SMCROL	Retel, 10mm thick fler		1.15	0.50
	above			
SMCTMCA5	Trunk mount c/w 6M cable		12.25	2.00
HDTMCA	HQ trunk mount c/w 5M cable		16.85	2.00
	cable			
5MC50MM	Magnetic base c/w 4M cable		12.75	2.00
SMCSOWM	Adjustable wing mount base		6.00	0.90
5MCGCD	Gutter clip deluxe		6.45	1.50
SMCBSD	Bumpor strap deluxe		11.50	1.50

SOMM



HS770

NB: PRICES INCLUDE VAT AT 15%

## JAYBEAM

Want the best, then why not buy Jaybeam. High quality materials and heavy duty construction for long maintenance free life.

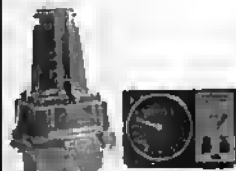
JAYBEAM 2 METRE			p.p.
HO/2M	Halo head only	0dBd	£7.13 £1.85
HM/2M	Halo with 24" mast	0dBd	£8.34 £1.85
CS/2M MK2	Colinear vert. omni	4.8dBd	£89.70 £2.85
LW5/2M	Yagi 5 element	7.8dBd	£17.31 £2.85
LW8/2M	Yagi 8 element	9.5dBd	£21.85 £2.85
LW10/2M	Yagi 10 element	10.5dBd	£28.23 £2.85
LW16/2M	Yagi 16 element	13.4dBd	£42.44 £3.65
PBM10/2M	Parabeam 10 ele	11.7dBd	£55.20 £3.65
PBM14/2M	Parabeam 14 ele	13.7dBd	£68.08 £3.65
Q4/2M	Quad 4 element	9.4dBd	£35.31 £2.85
Q6/2M	Quad 6 element	10.9dBd	£46.28 £2.85
Q8/2M	Quad 8 element	11.9dBd	£57.79 £2.85
D5/2M	Yagi 5/5 slot	10.0dBd	£30.82 £2.85
D8/2M	Yagi 8/8 slot	11.1dBd	£42.38 £2.85
5XY/2M	Yagi 5 ele cross	7.8dBd	£33.41 £2.85
8XY/2M	Yagi 8 ele cross	9.5dBd	£43.01 £2.85
10XY/2M	Yagi 10 ele cross	10.8dBd	£53.94 £2.85
PMH2/C	2 way harness c/w, pthr.		£12.82 £1.85
PMH2/2M	2 way harness 144MHz		£14.15 £1.85
PMH4/2M	4 way harness 144MHz		£35.25 £1.85

JAYBEAM 70 CENTIMETRES		
CB/70 MK2	Colinear vert. omni	6.1dBd
D8/70	Yagi 8/8 slot	12.3dBd
PBM18/70	Parabeam 18 ele	13.1dBd
PBM24/70	Parabeam 24 ele	15.1dBd
LW24/70	Yagi 24 element	14.8dBd
MBM28/70	Multibeam 28 ele	11.5dBd
MBM48/70	Multibeam 48 ele	14.0dBd
MBM88/70	Multibeam 88 ele	16.3dBd
8XY/70	Yagi 8 ele cross	10.0dBd
12XY/70	Yagi 12 ele cross	12.0dBd
PMH2/70	2 way 432MHz harness	
PMH4/70	4 way 432MHz harness	

JAYBEAM 6M/4M		
4Y4M	4 ele 4M yagr	£36.83 £2.85
4Y6M	4 ele 6M yagr	£48.88 £2.85

All prices include VAT @ 15%.  
Carriage extra, mainland rates shown.

## ROTATORS



Superb engineering standards combined with pin sharp setting accuracy means new technology from the rotator company.

— SMC

ANTENNA ROTATORS		
KR250	Bell type, Twist/Switch ctrl	£78.00
AR40	Bell type, Turn/Push control	£125.00
KR400RC	Bell type, 360 deg. meter	£169.00
AR50	Bell type, 5 pos. pre-select	£149.00
CD45	Bell type, meter readout	£219.00
KR600RC	Bell type, 360 deg. meter	£219.00
T2X	Bell type, motor readout	£449.00
HDR300	Bell type, Digital readout	£699.00
KR800SDX	Bell type, 450 deg. var. spd	£325.00
KR1000SDX	Bell type, 450 deg. var. spd	£368.00
KR2000	Bell type, Meter ± 90 deg.	£445.00
KR400	Bell type, Meter ± 180 deg.	£139.00
KR500	Elevation, Meter ± 90 deg.	£149.95
KR500B	Elevation, H/D KR500	£259.95
KR5400	Azimuth/Elev. Dual control	£279.00
KR5400A	Azimuth/Elev. Computer cont.	£339.00
KR5600	Azimuth/Elev. Dual control	£369.00
KR5600A	Azimuth/Elev. H/D Comp. cont.	£389.00
KR010	Intell. 1/F for KR5400/5600A	£275.00

ROTATOR HARDWARE		
9523	Support bearing Chan, Mustar	£19.95
9523/FU200	Support bearing FU200 etc.	£21.95
9525	Rotary bearing Guy type	£19.95
KS050	Rotary bearing 1 5/8" mast	£19.95
KS065	Rotary bearing 2" mast	£29.95
CK038	Lower mast clamp KR400/600	£16.95

ROTATOR CONTROL CABLE		
RC5W	5 way for KR400RC etc.	per/mtr £0.48
RC6W	6 way for KR250/400 etc.	per/mtr £0.56
RC8W	8 way for CD45 etc.	per/mtr £0.72

Free carriage on all rotators.  
Prices are inclusive of VAT.

MAIL ORDER or SHOWROOMS



see previous pages

# WATERS & STANTON ELECTRONICS

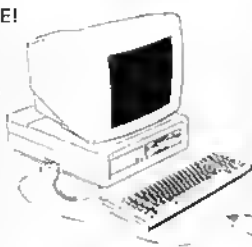
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## AMSTRAD COMPUTERS

HAM GEAR PART EXCHANGE WELCOME!

8256 Single disc with printer	£ 458.00
8512 Twin disc version of above	£ 573.00
NEW PC1640DD — In Stock —	£1033.00
NEW PC1640HD — In Stock —	£1375.00
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PC1512 20 Mb hard disc mono	£1033.00
PC1512 20 Mb hard disc colour	£1229.00
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DMP400 Printer 15"	£ 399.00



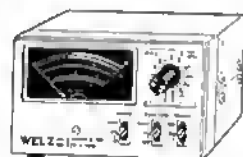
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VAT & SECURICOR

## WELZ NEW LOW PRICES!

### SP620

1.8-560MHz Power/VSWR  
0.2W/20W/200W average  
power or PEP. VSWR sensitivity 1W F.S.D.

£79.95 p&p £2.00



**SP420 SPECIAL OFFER!**  
140-525MHz Power/VSWR  
0.4W/20W/200W average  
power or PEP. VSWR sensitivity 4W F.S.D.

£52.75 p&p £2.00  
£22 off list price whilst stocks last

### WELZ-DIAMOND OI30 OISCON 25-1300MHz

The new OI30 from Diamond offers complete coverage from 25-1300MHz. No other antenna can offer this value for money! And an added bonus is that it can be used for transmit on all amateur bands between 50 and 1300MHz. (You cannot use 50MHz vertical polarization in the UK). Constructed of stainless steel and alloy, it comes complete with mast clamps and 50ft of coaxial cable.

£82.50 p&p £3.00

NEW

## FABULOUS SONY AIR-7

108-136MHz; 144-174MHz; 76-108MHz; + LW/MW/SW

The new Sony Air-7 is a superb new monitor with a performance and presentation that outperforms the competition. The PLL circuitry, LCD readout and 40 memories (10 on each band) make a most versatile package. Such features as priority channel, channel lockout, and delay are all included and the sensitivity puts most of the competition to shame! It also includes the broadcast bands both VHF and LW/MW and covers such things as NDB beacons as well as part of the marine band to 2194MHz. We are impressed and so will you be when you try it!



### SONY 2001D

150kHz-30MHz  
76-108MHz  
108-136MHz  
32 memories  
AM/SSB/FM BROADCAST

New from Sony is the 2001D general coverage portable receiver. It gives superb performance on the short wave bands using PLL circuitry and has separate filters for SSB and AM. A novel system of synchronous exalted-carrier provides a dramatic reduction in interference when receiving AM broadcast stations. Features include LCD readout, clock, scanning, timer, RF gain control, comprehensive memories and a host of features that make it an incredible performer. It equals or better many base station receivers we sell and the SSB performance with switchable upper and lower sideband is a joy to use.

## 3 BEST SELLING BOOKS

### NEW 1987 EDITION (1.6MHz-30MHz) UK LISTENERS CONFIDENTIAL FREQUENCY LIST

A completely updated version of our famous frequency list that covers everything between 1.6MHz and 30MHz. You won't find better value anywhere! Includes broadcast, marine, press, civil and military aircraft, embassy, naval and army, land based links, space frequencies etc. Full mode details are given e.g. AM/USB/RTTY + baud rate/FAX. The marine and aviation section has been considerably expanded with many details supplied by our readers. If you have read our previous issues you will want to get this latest copy! If you have never seen this publication before then you should really invest in a copy. Tremendous value at a bargain price. Order the new 1987 edition today. £5.95 plus 95p p&p

### NEW 1987 EDITION VHF/UHF AIRBAND FREQUENCY GUIDE

For the airband enthusiast we have completely rewritten this book into a comprehensive volume of both civil and military frequency allocations in the band 118-400MHz. Every known frequency has been listed from the smallest grass field to the largest airports in the UK. Clearly presented in large format, you will find everything neatly listed and easy to find. We've added full airways listings and company frequencies plus helipads, offshore rigs, air to air and much more. There is also some interesting editorial with hints and tips plus technical information. A very useful desktop reference book that should be on your bookshelf. Look for the full colour front cover of the Red Airways! Send today and get your copy of this handy reference manual. £5.95 plus 95p p&p

### COMPLETE GUIDE TO VHF/UHF FREQUENCIES 26-2250 MHz

This book was written at the request of the many enthusiasts who wanted more details about frequency allocations in the VHF/UHF part of the radio spectrum. Over 4000 copies sold in 4 months has to be a recommendation in itself! From 26 to 2250MHz, every service is listed with simplex and duplex splits, all in frequency order. It covers all the main user services in the UK including PMR, BT telephones, Fire, Ambulance, Police, Amateur, Aviation, Space etc. Readers should be aware that many of these frequencies cannot be legally monitored in the UK. Don't waste money on those expensive American listings, this one has been written in the UK for the UK user. Put a copy on your bookshelf today! £4.95 plus 70p p&p

## JUST PUBLISHED

### THE SECRET OF LEARNING MORSE CODE BY MARK FRANCIS

A brand new book covering a subject that causes many people problems. The author, Mark Francis, readily new his way into the subject and provides both hope for all those that are having difficulties with Morse or thought the code was beyond them. This book has been long overdue. It treats the subject of learning the code in a simple but comprehensive manner. The recommended methods ensure that anyone can learn Morse code in the minimum of time. The book is well chosen and really does explode some of the myths and myths surrounding the learning of Morse. The book forms a complete course with many practice passages for both sending and receiving. It also goes beyond the initial learning stages and takes you through your first QSO's covering abbreviations, procedures etc. Running to almost 100 pages with plenty of illustrations, this book looks set to fill a big gap in the market.

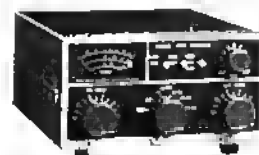
£4.95 + p&p 90p

### LOOK AT THIS "POUND CRUSHING" BARGAIN!

2M FM  
25 WATTS

£269 FREE DELIVERY  
ALINCO ALR-22E

The new Alinco 2m Transceiver breaks the price barrier! A full 25 watts of output power from 144-146MHz. Possibly the smallest 2m FM rig available and almost certainly the cheapest. We have carried out rigorous tests with this unit and have found it to be outstanding in both performance and quality. All the usual features are included such as 12.5 and 25KHz steps, 23 channels, scanning, up/down mic., tone-burst, repeater shift etc. And there is nothing else to buy. The price includes quick release mobile mount and all hardware, plus a full 12 months warranty from ourselves. (Parts and Labour)



### WELZ AC200 ATU

£159

This new ATU from Welz forms the basis of a complete matching system for the HF bands. It will handle up to 200W

PEP and will match any coax led antenna in the bands 80 to 10m. True RF power measurement is possible together with VSWR and the unit may be instantly switched out of circuit. Until the end of April we are also offering a free coaxial switch so that you may permanently connect two antenna systems to the unit. That's value!

MAIL ORDER & MAIN SHOWROOM:— 18-20 MAIN ROAD, HOCKLEY, ESSEX. Tel. Southend (0702) 206835 & 204965  
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HOURS: MON-SAT 9.00 am-5.30 pm. E.C WED 1.00 pm 24 HOUR ORDERPHONE



# RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913

Incorporated 1926

Limited by guarantee

Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the secretary, from whom full details of Society services may also be obtained.

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## ANNUAL SUBSCRIPTION RATES Once-off joining fee: £1.50

Corporate member: UK and overseas (Radio Communication by surface mail).

£15.50.

UK associate member: under 18: £6.95, Family member: £7.40

UK students over 18 and under 25: £10.45 (Applications should give applicant's age at

last renewal date and include evidence of student status)

Affiliated club or society/registered group (UK): £18.50 (including Radio Communication);

£11.10 (excluding Radio Communication) (Subscriptions include VAT where

applicable)

Memberships application forms available from RSGB HQ

## WRITING FOR THE RSGB

RADIO AMATEURS are inviolate. Whenever you visit someone's shack, there's always something that makes you think "Hay, that's clever!" Part of the RSGB's job is to help good ideas get around. We already have many ways of doing that, and we'd like to do it better. So we'd like to see more of your ideas.

A good idea has far more chance of catching on if it's down on paper. There's a huge amount of information on the "photocopy grapevine". To channel this information to the people who are most likely to find it useful, the RSGB publishes several specialist newsletters. And we try to get the pick of the crop into *Radio Communication* and RSGB books.

### Newsletters and Technical Topics

Writing for a newsletter is simple: it's almost like writing a personal letter to the newsletter editor. If your idea is good—and most are—he'll use it. He may need to retype the material you send, but he'll be very pleased if he doesn't need to rewrite or redraw it. If your material gets into a newsletter without editorial changes, it's a sign that you're on the right track to becoming a good technical writer.

Technical Topics is *Radio Communication's* general technical newsletter, and is the place for items of interest and novelty. Pat Hawker's space is limited, however, so he can't include everything he receives.

### Radio Communication articles

If your idea translates into a big chunk of writing with a lot of drawings, it could be just the thing for this magazine. You know what kind of articles you like to read: those are what we'd like you to write!

The range of subjects is enormous. We'd hate to put you off by being over-specific. The more we see, the more we realise that radio amateurs are perpetually inventing new things that we've never even dreamed of.

As well as the amateur radio news and regular features, such as you find in other magazines, *Radio Communication* has to devote space to RSGB business and to all the other activities which the Society organises. Articles are listed in the remaining space, typically nine pages a month. That isn't much, so articles of lasting value get preference over pure entertainment. In particular, we're always looking for articles that help people to enjoy learning more about amateur radio, and encourage them to try new things.

Two types of article are especially welcome: fully-finished constructional projects, especially for newcomers, and articles which pass an experience about the practical side of amateur radio.

### RSGB books

*Radio Communication* articles should rarely run to more than four pages, and readers tend to lose interest in long articles spreading over several months. But there's still scope for long contributions in RSGB books. There are usually three or four RSGB books in active preparation, and as many again at the ideas stage. One of them may be the right place for your material. Contributing to a book is actually easier than writing a polished article, because responsibility for the whole text lies with the person who's compiling the book.

### Send an outline

If you are not sure what use the magazine or an RSGB book might be able to make of your idea, why not ask? Prepare an outline, typically one page, and send it to: The Editor-in-Chief, Publications Group, at RSGB HQ. We'll help steer you in the right direction.

Preparing an outline has two big advantages for a writer. It will help you to concentrate on what you're actually going to say, which is far more important than the detail of how you're going to say it. And sending an outline avoids the risk of writing something which is technically wonderful but doesn't fit into any of the RSGB's publishing plans. If you send us an outline, and the subject is right, we'll help you to write something that the Society can publish—and will pay for.

### Don't be shy!

We're always looking for new ideas and new writers. And we'll also be looking for new, madam material on specific topics. As well as contacting people we already know, we'll be head-hunting through *Radio Communication*. But we aren't psychic: you have to make the first move, so please let us know you're there!

Technical & Publications Committee

# RSGB NATIONAL HF CONVENTION

Belfry Hotel, Milton Common, Oxford

## SUNDAY 27 SEPTEMBER 1987

Provisional Programme

Doors open 9.30am

Admission £3

ONE DAY CONVENTION WITH LECTURE PROGRAMME

- ★ QSL checking for awards (not DXCC or IOTA)
- ★ QSL Bureau posting box (cards must be pre-sorted)
- ★ 1.8MHz get-together
- ★ Car boot sale (£5 per pitch)
- ★ Worked All Britain stand
- ★ Southern 10m FM Group
- ★ RNARS QRQ cw tests
- ★ Doctor DX" computerised contesting
- ★ Vertical Antenna Pattern Modelling
- ★ QSL "arrivals" board
- ★ CW pile-up competition
- ★ RSGB bookstall
- ★ Presentation of trophies
- ★ HF demonstration station by Chiltern ARC
- ★ RSGB committee displays (EMC, Propagation Studies, HF and HF Contests)
- ★ DX quiz    ★ G-QRP Club    ★ Constructional advice booth    ★ BYLARA    ★ Bars

★ Also, it is hoped that one or more members of the Planning Panel will be available to answer questions.

### PROVISIONAL LECTURE PROGRAMME

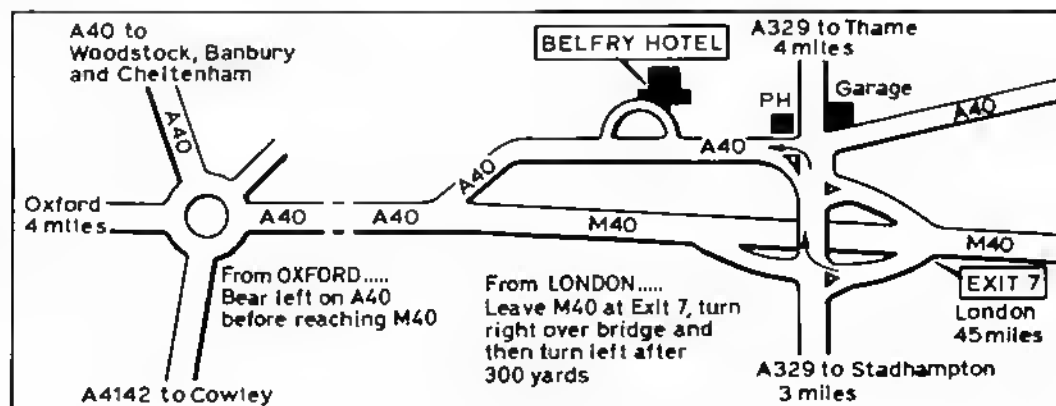
- |                  |   |
|------------------|---|
| <b>1030-1130</b> | "Special Force Signals" (Illustrated history covering out-stations and base stations in Europe and the Far East, 1941-5), John Brown, G3EUR |
| <b>1145-1245</b> | "Measurements in the Amateur's Shack", Peter Chadwick, G3RZP  |
| <b>1330-1415</b> | Presentation of trophies  |
| <b>1430-1530</b> | "Aerials Illuminated", David Yates, G3PGQ.  |
| <b>1545-1715</b> | "DX Forum", with Einar Enderud, LA1EE/3Y1EE (Peter 1st Island, 1987), and Steve Lowe, G4JVG, and others (Market Reef 1987).                 |

If there is sufficient demand, FCC qualifying tests (for USA licences) will be held on Saturday 26 September, at the Belfry Hotel. Those interested should contact Greg Lambert, G0/KK1J, 27 Redcliffe Road, London SW10 9NP. Tel: 01-352 2746.

Non-amateur members of the family may wish to visit Oxford (10 miles) or Blenheim Palace (20 miles).

Light lunches and snacks will be available at the hotel for a modest charge. Dinner, bed and breakfast is available for Saturday night at £30. Bed and breakfast £18 per person.

### HOW TO GET THERE



# Members' Mailbag

THE EDITOR,  
RADIO COMMUNICATION,  
LAMBDA HOUSE,  
CRANBORNE ROAD,  
POTTERS BAR, EN6 3JE

The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

## PME—POSTSCRIPT

Thanks to all those who've written to me. I hope some of them are happier—like the G4 who gets sparks when he connects his earthen antenna to his "mains earthed" rig! At my last house I could get 0.25A at 20V between the mains earth and a poor ri earth.

The idea of pme is to ensure that there is no potential difference between, say, an electric fire with a metal case connected to the mains earth and a water tap or central heating radiator. Even if the radiator is, say 100V above ground, no hazard exists—until you bring in an external earth. For those who say that broken neutrals don't happen, you should see some of the letters I've had! Or ask GW4FRX. Protective bonding minimises the hazard—that's why it's there. PME has been used for years on the Continent—but they put earth electrodes at each house. PME in the UK varies from one electrically board to another—it is believed that some boards hit an earth rod at each house, other certainly do not.

The vital point is to keep the "earth" on the mains separate from the earth for the r—or else to bond them. Some boards may need the bonding back at the consumer unit to be done by them, or by a qualified electrician. A transformer won't help—you must not be able to touch the ri earth and anything connected to the mains earth—even 25V will sting!

G3WAL doesn't get the point—the chances of a ruptured neutral happening at that moment are remote—but if it does, you'll know it. The shock of seeing a spark when you connect the earth can lead to unpleasant results—like dropping things—and Murphy's Law says they'll be expensive and break!

The most disturbing aspect is the number of amateurs who are electrically board employees who have spoken to me. Disturbing because they say: "Don't quote me—but there was a man in our board said things like that and he got eased out—I want to keep my job".

PME is not really a problem. If you've bonded the ri earth to the mains earth, grounding things to the central heating might (or might not) help with emc, if you haven't, you shouldn't have an ri earth in touching distance.

Peter Chadwick, G3RZP

## CONTEST ADJUDICATION

Sir—After reading the adjudicator's comments on the September '86 144MHz Trophy Contest (Radio Communication Jan 87), I felt worried that he had clouded and confused the issue of QRM for the majority of amateurs. I would like to give some alternative reasoning, different comparisons and some more information to show that interference is not the problem; which, through unreasonable logic, was suggested.

The maximum figure of 900 odd QSOs will be difficult to pass due to the non-uniform activity over the 24h contest period, varying from 10 QSO/h early Sunday mornings to 60+ in the first hours of the contest. The reason for this upper limit is the time taken for both stations to exchange information while the lower limit is because the majority of the 3,000 stations estimated to be active are tucked up in bed. During contests 60 per cent of contacts we make are non-G, a third of these being German, these are distant stations whom we contact regularly. It is not a matter of chance due to QRM. The fact that such high QSO rates and distances are achieved indicates that QRM is not the limiting factor.

Comparison is made between leading single-operator stations and average multi-op on the basis that the number of QSOs is similar. This comparison between good and average stations finds, unsurprisingly, good and lax log keeping. If, however, the log of a leading multi-op is examined, good log keeping would also be found, showing that QRM at portable sites is not a problem. It was also

found constructive to compare score versus amplifier, but it notice is also taken of other factors present, such as site, antenna system, operator ability and preparation prior to the contest, then the correlation found is that between result and total commitment.

Larger amplifiers working all higher EHT voltages are more linear. A 4CX250B running 350W p.e.p. gives third and fifth-order intermodulation products of -25dB, while for a 8877 (3CX1500A7) these figures are -40 and -41dB respectively. Given that imd performance is fairly independent of output power, the latter tube is much cleaner. The leading groups need this extra cleanliness since, due to the better sites and higher gain antenna systems used, im products are more noticeable, and amateurs are more critical of the "big boys".

The adjudicator's list of tenuous connections is the dubious result of choosing QRM as a problem and then trying to find facts and statistics to prove it. This is very bad practice and has resulted in giving a very bad impression of vhf contest groups. Leading contest groups now seem guilty until they can prove themselves innocent.

Chris Nunn, G8NEH

PS: Amplifier performance notes from Cere and leading of power grid tubes and 8877 data sheet both from Elmac. Log keeping information from discussions with members of the VHF Contest Committee at the 1986 VHF Convention.

## THE ADJUDICATOR REPLIES . . .

Sir—My report on the 1986 September 144MHz contest was meant to start a public discussion on the trend for contest stations to use bigger and bigger power amplifiers. Perhaps it was rather too strongly worded, and I apologise to stations who might feel that their good name has been blackened.

G8NEH suggests that I am trying to fit the facts to a theory, but the results table speaks for itself. There is undoubtedly a stronger correlation between amplifier type and success than between antenna type or location and success. The correlation is even stronger if unadjudicated scores (before deduction of points for unmarked duplicates etc) are used. Unfortunately, the other factors he mentions cannot be quantified.

Obviously all the factors are significant, and undoubtedly the commitment of leading groups is a major reason for their success. I merely offered the QRM theory as an explanation which would account for the observed facts, and bearing in mind that the commitment of a relatively unsuccessful group is not necessarily any less than a successful group, I am not sure that G8NEH's theories are any more convincing than mine. I do not agree that it is not easy to make more than 900 contacts in 24h, but the points scored per contact by the leading stations is higher from the outset, and remains so throughout the contest, suggesting that they are more easily heard by the distant stations—or that they can hear the more distant stations. Although receiver performance will be critical in the latter case, the general level of QRM at both ends of the QSO will also be important, especially as in most cases the distant station will be less well equipped than the contest station.

I cannot accept G8NEH's interpretation of my comparison of P and single-operator (usually fixed station) logs. The comparison is not based on selected pairs, but is generally true from top to bottom of the table. This conclusion is based on checking tens of thousands of contacts made during this event in the last three years. There are some notable exceptions, particularly from P stations who obviously check their entry against a database before submitting it, but in general it is true.

It is very unlikely that the correlation is due simply to the fact that the leading groups are the ones most likely to use the best technology available, whether or not it gives them a real advantage in terms of position in a contest results table. However, when that technology involves the use of amplifiers which are capable of several times the maximum permitted power, I do not think that it is unreasonable to ask stations using them to demonstrate that the maximum power limit is not being exceeded.

I agree with G8NEH's comments on signal

quality, but it is worth mentioning that the performance of the power amplifier itself is only one of the factors to be considered. Trioda 8877 amplifiers require some 15W to drive them to 400W output, and it is well known that the cleanliness of the output of many commercial transceivers at this level is not adequate for feeding into a big power amplifier connected to a high gain antenna. It is much easier to obtain a clean 2-3W drive signal for a tetrode amplifier from such a transceiver, so there is a real risk that a triode amplifier driven by the same equipment as a tetrode amplifier and giving the same output power may give a poorer signal. Obviously, experienced amateurs will avoid this pitfall, but I think it is misleading to refer to the advantages of the triodes without mentioning the disadvantages.

I asked in my report whether 144MHz contesters really wanted the trend to using big power amplifiers to continue. The reaction so far has been a resounding yes. Is that a universal view?

D A York, G4JLG

## OPENING UP 50MHz

Sir—Having today ventured onto 50MHz for the first time, I would like to acknowledge the work done by the RSGB in making this band available, and to thank two B-class stations worked, G8HLL and G1DQX, for the pleasant, informative, and welcoming QSO. This was made more pleasing when G1DQX wished 73 and signed out proudly in very readable cw.

Thanks to all,

G G Cheetham, G0EHK

Sir—I suspect this will be only one of many letters you receive expressing the wrath of Class A licence holders at the latest "Let's be kind to the Class B guys", namely the 50 and 70MHz allocation.

It would appear that there is no need to work for any enhancement of your licence anymore, some idiot in authority will give it to you.

Generalising from the standard of Class B operators heard, they are no better and sadly sometimes worse than citizen band users. I know that this tars everyone with the same brush, yet this does not stop these idiots from using bands which allow them to be heard over greater distances.

I think I have a quicker and better idea, let's do away with the Class B and give them the whole spectrum to wail around in, let's show the whole world what complete idiots we are, who needs to try a little harder to get a Class A; in fact, why test anyone at all!

Don't get me wrong, I am all for improvement in general conditions within the amateur radio world; however, I think that the time has come to ask for improvement in operator performance before dishing out any more freebies.

I await the plethora of whining replies or, perhaps, the odd letter of support.

R T G Freeman, G4SDJ

The overwhelming argument for Class B licensees using all bands above 30MHz is in the Articles of the International Telecommunication Union. Article 32 section 2735 applies; it states: "Any person seeking a license to operate the apparatus of an amateur radio station shall prove that he is able to send correctly by hand and to receive correctly by ear texts in morse code signals. The administrations concerned may however, waive this requirement in the case of stations making use exclusively of frequencies above 30MHz." By and large, administrations around the world wish to comply with these regulations. Are there any Class B operators who wish to comment, since the Society has received three letters expressing similar views to those of G4SDJ?

## WHAT OF THE FUTURE?

Sir—I certainly had a most interesting time on 3.5MHz one day recently—but it didn't do much to maintain my faith in the sale future of amateur radio! In the course of the day I spoke with two G0s who didn't know how to calculate the dc input to their finalist (RAE examiners please note: valves are still in general use in many modern transceivers), and another Class A licensee who obtained two "credits" with his RAE, and to quote, "Never did get the hang of Ohm's law!" When on my fourth QSO I came across a gentleman who couldn't



read a circuit diagram (Iry laull finding over the air in that situation) I gave up and went off for a well-needed pint!

To cap it all, when I returned from my local hostelry, it was to find a letter from the editor of a very well-known commercial radio magazine who had declined to publish the design of a simple ssb transmitter I had submitted to him. To be fair, the design had included several potted components that I had culled from various surplus chassis, and so were not easily available. However, details of the components used were available and could have been easily duplicated by any amateur worth his salt.

The rejection I accepted, but it was the final sentence of the editor's letter that really struck home. I quote: *For the majority of radio enthusiasts, the pioneering spirit has regrettably disappeared.*

Well, I guess he should know, but from that comment it would seem that poor old Gerry Merceuse (Gerry who?) simply wasted his time!

H N Kirk, G3JDK

Sir—How refreshing to read Weller Farrer's letter in June's "Members' Mailbag". Perhaps it is the mark of old age, but I find the over-increasing sophistication in the output of the makers of modern transceivers—and receivers—most distasteful. Mr Farrer's amusing letter captures the feelings of, I am sure, many amateur radio enthusiasts. Quite apart from the astronomical prices of these instruments—"for the serious operator"—I too would be glad to see a return to something like the old FT101 series which confined its operating procedures to the essentials.

On the same subject—congratulations on the article on the RC14. At last a project which will interest the many readers of *Radio Communication* who do not possess a degree in electronic engineering.

A J Mallors, G4GOK

We received several letters making similar points—we'd like to hear what manufacturers have to say on the subject.

#### DOES YOUR RIG CONTAIN A BOMB?

Sir—In the past, before the computer took over world over and amateur radio was simple, the worst you could expect to either explode or implode was a failing capacitor or a valve. However, in most modern equipment there exists a potential bomb, usually no bigger than the average shirt button.

Now before you accuse me of scaremongering, my information comes from the Railways Inspectorate, Department of Transport and concerns two accidents.

I have recently been advised of the danger of explosion which is present with lithium batteries. You know that such "shirt-bullet" batteries are frequently used to provide back-up power for micro-processor memories in the event of mains failure.

In one case a small single lithium cell was incorporated into telecommunications equipment which was under test at the manufacturer's works. The circuit included a diode to prevent the normal mains supply from back-feeding to the cell. During equipment tests for component failure, the blocking diode was short-circuited and power applied. The resulting explosion of the cell wrecked the test laboratory and blew out the windows; fortunately nobody was injured.

A second incident occurred when a bus ticket dispensing machine was repaired and under test. The blocking diode failed and the resulting explosion caused injury to five people, all requiring hospital treatment for lung inhalation. In each case the cell involved was of the lithium thionyl chloride type.

You have been warned. I, however, will sleep peacefully, as I am a dedicated home-brew fanatic.

Geoff Sims, G4GNQ

#### ALL ORIOLO UP?

Sir—Recently I wrote to the "Helpines" section of *Radio Communication* requesting information on a source of supply of silica gel sachets. Little did I imagine that I would receive more than the name and address of suppliers! I had thought that

perhaps one or two people would write in with the location of a supplier to whom I could write.

However, such is the generosity of *Radio Communication* readers, that within a few days of publication a number of envelopes and packets containing silica gel sachets of sizes ranging from postage stamp to a good handful started arriving! Apart from some anonymous senders, all declined payment—even for substantial postage incurred. I have gratefully acknowledged to everyone who included a return address, and hope that those who did not include an address will accept this letter as my heartfelt expression of thanks. Perhaps some day I can begin to repay this outflow of generosity by replying to someone else's plea for help.

Meantime, if anyone else wants any silica gel, I have a supplier's address (it's rather expensive!) and some tips to pass on, and will also gladly share what I have been so generously sent.

David Shirley, BAS30385

Sir—What do you mean there's nothing available to modify for 50MHz? May I remind you that in the real world, away from the ivory towers of RSGB HQ, there are huge numbers of multi-mode transceivers just ideal for 50 or 70MHz modifications, running at present with local oscillators typically 10-695MHz above 28MHz. What happens if you run the low side of signal? Typically they will also cover the 2MHz of air space required for 50MHz, and Motorola make power devices with the necessary 11 and some packaging as the originals.

And did I mention cb—now did I?

Stephen Dyke, G3ROZ

"News Bulletin" editor GW4FRX points out that the phrase used in the feature related to experimental or commercial equipment. He added that "... Mr Dyke is obviously very familiar with the internal architecture of cb equipment. Couldn't he perhaps write an interesting article for *Radio Communication* on getting them going on 50 or 70MHz instead of wasting his literary talents on splenetic letters to the editor? ... How about it, Mr Dyke? (or anyone else, for that matter).

## Nominations for election to the 1988 Council of the RSGB

The Society's Articles of Association require that members who are entitled to vote be notified of those Council members who retire at the end of each year. The Council members who retire on 31 December 1987 are:

#### ORDINARY MEMBERS

E J Allaway, G3FKM, who is eligible and willing to accept nomination for re-election.

W J McClintock, G3VPK, who is not eligible for re-election under Article 26.

#### ZONAL MEMBERS

Zone A: D S Smith, G4DAX, who is eligible and willing to accept nomination for re-election.

Zone B: H S Pinchin, G3VPE, who is not eligible for re-election under Article 26.

Zone D: J N Gannaway, G3YGF, who is eligible and willing to accept nomination for re-election.

Zone F: J T Barnes, G13USS, who is eligible and willing to accept nomination for re-election.

Zone G: F D Hall, G4BZX, who is not eligible for re-election under Article 26.

For composition of RSGB Zones, see page 648 of this issue.

### Election of the 1988 Council

#### The role of Council and Council members

To assist candidates and those making nominations, the following notes are intended to summarise very briefly the main functions of Council and Council members.

The size, complexity and long-term nature of the Society's activities makes it necessary for the day-to-day control of its affairs to be in the hands of a stable administration. At present, the workload is divided between the full-time staff, approximately 30 in number, and the volunteer effort represented by the 16 sub-committees of Council and its honorary officers. Of the HQ effort, roughly half can be regarded as being devoted directly to amateur radio matters, the remainder being concerned with administrative tasks. Responsibility to Council for the working of HQ is primarily with the Finance & Staff Committee, with the Licensing Advisory Committee being heavily involved with licensing aspects. The work of the other committees is mainly concerned with amateur radio matters, although there may be major financial implications.

The main work of Council is that of monitoring the work of HQ and the committees to ensure their

effectiveness in handling the commercial aspects of the Society's operation (an income of over £1 million per annum), together with those matters it has identified as being important to amateur radio on both the national and international level.

The main duty of Council members obviously is to play an active part in this operation. This will involve, *inter alia*, the attendance at, typically, seven Council meetings each year; the critical review of the 200 or so sets of committee minutes and working documents produced during the same period; and the capacity to react constructively to this and other information. Council members are also expected to deal with individual members' problems; their duty is to ensure that these are dealt with by the responsible committee or other body.

#### Candidate's qualifications and details

(a) The candidate must have been a corporate member for at least three years at the time of nomination.

(b) The candidate must submit the following:

- Written, signed consent to accept office, if elected.
- If appropriate, a statement that she/he is over 70 years of age or will become so during the term of office if elected. Under the Companies Act, it is necessary for her/his election to be confirmed by the annual general meeting, which is part of the annual meeting.
- A statement declaring any commercial interest in the field of amateur radio.

These declarations, together with nominations, may conveniently be made by using the "Candidate's Form" for the Election of Ordinary or Zonal Members of Council" available on request from: The Secretary (DAE), RSGB, Lambda House, Cranborne Road, Pollers Bar, Herts EN6 3JE.

#### Nomination procedure

(1) The nominations for each candidate, at least 10 in number, must be fully-paid-up corporate members at the time of nomination. In the case of zonal members, the candidates and nominators must reside in the zone concerned.

(2) Nominators may nominate only one candidate.

(3) The nominations may be made on the "Candidate's Form" referred to above, the associated "Nominator's Form" or on any sheet of paper. Each nomination must be signed by the nominator, who should include the name of his town.

#### Additional information on candidates

In order to assist the membership in voting, a candidate may enclose a maximum of 200 words as a cv or statement describing pertinent experience which will be circulated with the ballot forms. This must be confined to biographical facts. Clearly, involvement with decision-making in organisations of similar size to the RSGB (or larger) would be relevant, and this should be stated. Prospective candidates will find it useful to have had experience of RSGB procedures, including committee membership, duties as regional or area representatives, writing for Society publications or organising events. This experience should be quoted together with details of participation in amateur radio at the local level. *Bona fide* statements will receive the minimum of editing consistent with good style and factual accuracy; however, statements exceeding 200 words are likely to be cut to that number.

The candidate may also supply a recent black-and-white head-and-shoulders photograph for publication with the cv, if she/he wishes.

#### Information on nominators

Nominators are required to give details of their place of residence. It is to be noted that voters may place higher value on nominations if they are seen to have come from many parts of the UK in the case of Ordinary Members, or many parts of the zone in the case of Zonal Members, rather than a restricted area.

Nominators may also supply for publication details of how long they have known the candidate and all relevant positions that they hold or have held; for example, as the chairman of an amateur radio club, a member of Council etc, or who can indicate management experience. The standard nomination form referred to above is designed to facilitate the supply of this information.

The candidate's declaration together with the completed nominations should be sent in a single closed envelope and addressed to: The Secretary (DAE), RSGB, Lambda House, Cranborne Road, Pollers Bar, Herts EN6 3JE, to arrive no later than 10 October 1987. (Since this date is specified in the Society's Articles of Association and this year falls on a Saturday, we strongly recommend that nominations arrive by post no later than the close of business on Friday 9 October 1987.)

Please mark the envelope "1988 Council Nomination". Nominations for all candidates will be acknowledged by return of post.

# RSGB NATIONAL VHF CONVENTION 1987

Ken Willis, G8VR

THE RSGB NATIONAL VHF CONVENTION 1987 was held on 26 April. Once again the venue was Sandown Park, and the event proved more popular than ever, with around 3,000 visitors passing through the turnstiles—a new attendance record. According to traders who regularly attend these functions, this convention has become the major RSGB event in the south, and the best single-day event in the entire calendar. A bonus this year was the weather, which was superb, enabling visitors to take time out of the crowded convention halls to picnic or rag-chew in the surrounding grounds.

The VHF Committee had been unable to gain entry to the hall until nearly 9pm the previous evening, so its members toiled late into the night erecting stands and carrying in tables to set the scene for next day. As midnight approached, the RSGB President was observed to hang up her chain of office and do a great job sweeping up mounds of debris left by an earlier race meeting attended by 15,000 punters! The activity started up again early on Sunday morning as traders with their vehicles, some of them travelling long distances, began to arrive. Long before the doors opened, the car parks were filling, some having come from as far away as Scotland, and long lines of visitors began to form, some anxious no doubt to be early and catch any bargains on offer. Inside the hall activity was feverish with last-minute preparations but all was ready as the doors opened on time and the flood of visitors, which was to continue most of the day, surged in.

The afternoon lecture sessions were opened formally by the RSGB President, Mrs Joan Heathershaw, G4CHH, who in her address spoke of the leading role of the Society internationally through its active participation in IARU affairs. She was cautiously optimistic about an early release of the 50 and 70MHz bands to Class B operators, and an extension of 50MHz facilities as a result of continued liaison between the Society and the licensing authority (recent events having fully justified her views).

As usual, three parallel lecture streams offered a variety of subjects to interest the vhf operator. Stream A opened with a lecture from Angus McKenzie, G3OSS, on the subject of equipment evaluation, a topic for which he has become well known in recent years. Among many aspects of this subject, Angus described measures by which reliable and repeatable figures relating to receiver front-end performance could be obtained, commenting on the improvements in modern equipment compared with earlier days, manufacturers having obviously learned by experience.

In the second lecture in this session, John Regnault, G4SWX, dealt with linear amplifiers. John favours valves rather than semi-conductor devices for this purpose, and strongly emphasised what should be obvious but is frequently overlooked—that to achieve linear performance, the amplifier must be operated only within the linear portion of its input-output characteristic. He reminded his audience that, while driving an amplifier with



The VHF Manager's Trophy went to the Sheppey Western and Sheppey Outcasts contest groups

around one half of its rated input may reduce its output by as much as 70 per cent, the signal will at least be clean, and the loss no more than a couple of decibels or so, a small penalty to pay. John suggested that manufacturers offering amplifiers for sale should not go to such lengths to stress the maximum output power capability of their products, but instead tell operators how they can be used with minimum "splatter". John was equally critical of power supplies which cannot cope with the transient peaks associated with ssb.

Following normal practice, the final session in this stream was a question-and-answer forum, with the VHF Committee bombarded by questions from a lively audience. Topics covered a wide range: meteor scatter procedures, packet radio, CEPT licences, repeater matters, beacon frequencies, channel spacing, Syledis—you name it! The role and "accountability" of the VHF Committee also came up for discussion in a session which, as always, had to be curtailed due to lack of time rather than scarcity of topics.

Stream B opened with a lecture by Malcolm Appleby, G3ZNU, on the UK "Cellnet" mobile telephone system. Malcolm gave a most comprehensive



The Warrington CG receives the 1951 Council Cup



I C Otter, LX2GB, receives the Thorogood Trophy

**RSGB President Joan Heathshaw, G4CHH, presented cups and trophies to the winners of vhf awards during the convention.**



**The Parallel Lines CG celebrate a triple success with the Michel-Milling Trophy, the VHF Contest Committee Cup and the Surrey Trophy**

account of a network which is very much more complex than it might at first sight appear, and, in a well-illustrated lecture, the function of some of the antennas which have sprung up on high buildings around the country became more obvious.

Henry Neale, G3REH, then dealt with the reception and presentation of data transmitted by weather satellites, a subject which is interesting many vhf operators these days. Henry is well known through the Remote Imaging Group which he inaugurated, and his description of the techniques involved in this aspect of vhf will no doubt encourage others to try their hand in this fascinating field.

The third stream, devoted as usual to microwave matters, was opened by Les Sharrock, G3BNL, who dealt in a very professional way with the technicalities of phase-locking techniques for narrowband operation. The presentation was much appreciated by those *afficionados* who prefer centimetric to the larger metre wavebands, a field where the home-constructor still flourishes and real pioneer work is being carried out, notably in this country. To continue the session, a lecture entitled "Hitch-Hikers's Guide to 13 and 9cms" prepared by Dave Robinson, G4FRE, was most ably presented by Sam Jewell, G4DDK, Dave having only recently left hospital. This lecture showed how anyone who might have ventured as far away from vhf as the 1,296MHz band could proceed even further into the unknown,

where milliwatts and a small dish could provide interesting contacts with relatively simple equipment.

Altogether a very fine series of lectures, and the RSGB is fortunate to have among its members so many who can present highly technical subjects in a professional yet informal manner.



**The Tartan Trophy was awarded to the South of Scotland CG**

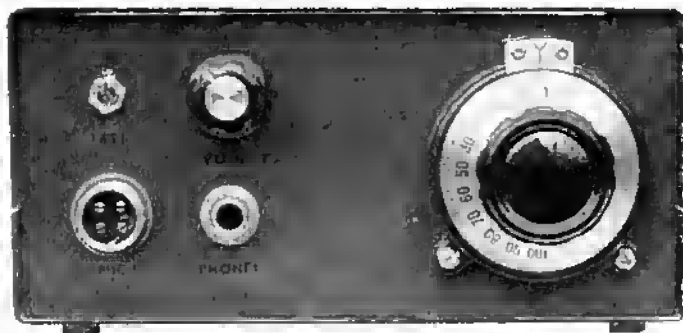


**The Arthur Watts Trophy to the East Kent RS**

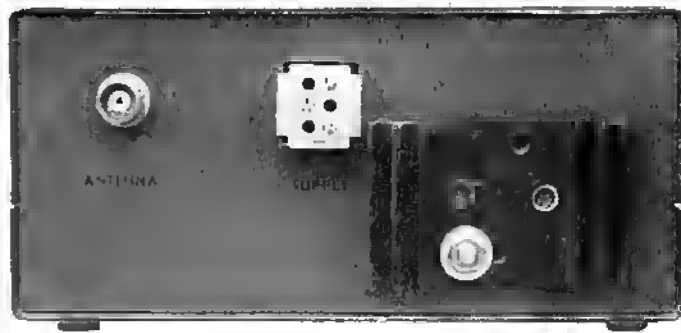
A successful event such as this takes much planning and hard work. Thanks are due to the Exhibition & Rally Committee of the RSGB, and especially to Les Hawkyard who organised the trade show, with some 65 traders this year—an increase on previous vhf conventions. VHF Committee members were greatly assisted in setting up the show by a "heavy gang" formed of members from the Echelford Club and the Kingston (Surrey) ARS. Echelford also provided talk-in facilities which worked admirably. No flea-market was arranged this year, since space was required for traders. Booking Sandown Park, or any other suitable venue, is never easy, since any suitable premises are generally in great demand. Recent alterations to the hall at Sandown have, in fact, improved facilities for our conventions—giving some 10 per cent extra space—so it is hoped to book it again next year, preferably without the problems associated with a major race meeting coinciding with the setting-up date. Catering seemed to be very much better this year, with hot and cold snacks at reasonable prices, with quick service and space to sit and eat, but bar prices discouraged all but the very affluent. Still, it was a great day, and a pleasant occasion to turn voices into faces!

See you next year!

# A QRP TRANSCEIVER FOR 1.8MHz



Front view of transceiver. On this prototype the TUNE switch is labelled TEST



Rear view of transceiver

*S E Hunt, Msc G3TXQ\**

## Introduction

This transceiver was developed as part of a 1.8MHz portable station, the other components being a QRP amp, a battery-pack and a 200ft kite-supported antenna. It would be a good constructional project for the new Class A licensee or for anyone whose station lacks 1.8MHz coverage. The 2W output level may seem a little low, but it results in low battery drain and is adequate to give many 1.8MHz contacts.

I make no claim for circuit originality. Much of the design was adapted from other published circuitry, particularly from the designer's "bible"—*Solid State Design for the Radio Amateur* (ARRL). However, I do claim that the design is repeatable—six transceivers have been built to this circuit and have worked first-time. Repeatability is achieved by extensive use of negative feedback; this leads to lower gain-per-stage (and therefore the need for more stages) but makes performance largely independent of transistor parameter variations.

## Circuit description (Fig 1)

The transceiver comprises a direct-conversion receiver together with a double-sideband (dssb) transmitter. This approach results in much simpler equipment than a superhet design, and is capable of surprisingly good performance, particularly if care is taken over the mixer circuitry.

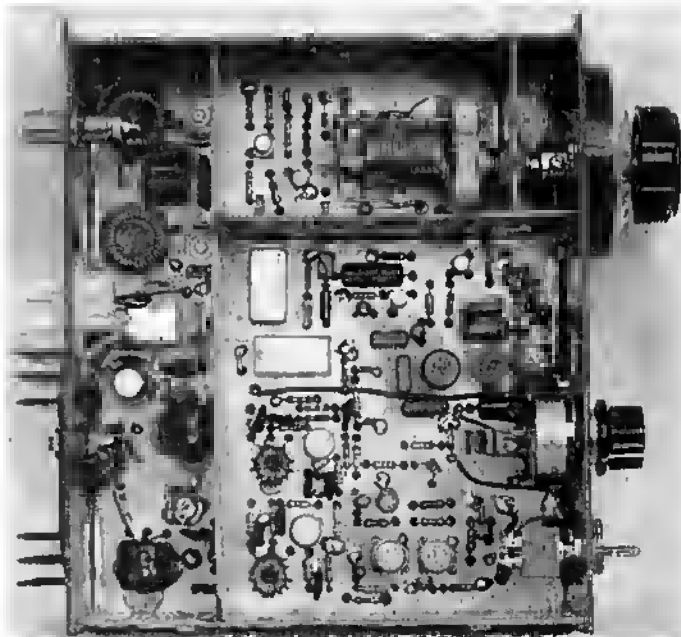
During reception, signals are routed through the bandpass filter (L1, L2 and C25-C31) to a double-balanced mixer, M1, where they are translated down to baseband. It is vital for the mixer to be terminated properly over a wide range of frequencies, and this is achieved by a diplexer comprising R34, RFC2 and C32-C34. Unwanted rf products from the mixer, rejected by RFC2, pass through C32 to the 47Ω terminating resistor R34. The wanted audio products pass through RFC2 and C34 to a common-base amplifier stage which is biased such that it presents a 50Ω load impedance. The supply rail for this stage comes via an emitter-follower, TR5, which has a long time-constant (4s) RC circuit across its base. This helps to prevent any hum on the 12V rail reaching TR6 and being amplified by IC3.

The voltage gain of the common-base stage (about  $\times 20$ ) is controlled by R37 which also determines the source resistance for the following low-pass filter (L3, L4 and C39-C43). This filter is a Chebyshev design and it determines the overall selectivity of the receiver. The filter is followed by a single 741 op-amp stage which gives adequate gain for headphone listening; however, an LM380 audio output stage can easily be added if you require loudspeaker operation.

Sieve Hunt was born in 1947 and became interested in amateur radio as a teenager when he was given a crystal set for Christmas. He was licensed at the age of 17, and began operating on 1.8MHz using a home-built copy of the Codar AT5 transmitter and an HRO receiver. He is a professional electronics engineer, having studied at Hendon College of Technology under sponsorship from the BBC, and later at Birmingham University. His main interests are home-construction and 1.8MHz, mobile and portable operation.

On transmit, audio signals from the microphone are amplified in IC1 and IC2, and routed to the double-balanced mixer where they are heterodyned up into the 1.8MHz band as a double-sideband suppressed-carrier signal. Capacitors C56 and C57 ensure some high-frequency roll-off of the audio signal and thereby restrict the transmitted bandwidth. A 6dB attenuator (R12-R14) provides a good 50Ω termination for the mixer. The dssb signal is amplified by two broadband feedback amplifiers, TR2 and TR3, each having a gain of 15dB. TR3 is biased to a higher standing current to keep distortion products low.

The pa stage is a single-ended design by VESFP (1). The inclusion of unbypassed emitter resistors R30-R32 establishes the gain of the pa and also helps to prevent thermal runaway by stabilising the bias point. Additional rf negative feedback is provided by the shunt feedback resistor R29. I chose to run the pa at a moderately high standing current (330mA) in order to reduce distortion products, thinking that at some stage I might use the transceiver as a "driver" for a 10-15W linear amplifier. The pa output (about 2W p.e.p.) is routed through the bandpass filter to the antenna. I used a 2N5632 transistor in the pa because I happened to have one in the junk-box; the slightly less expensive 2N3375 would probably perform just as well. VESFP used a 2N5590 transistor but this would need different mounting arrangements.



Top view of transceiver

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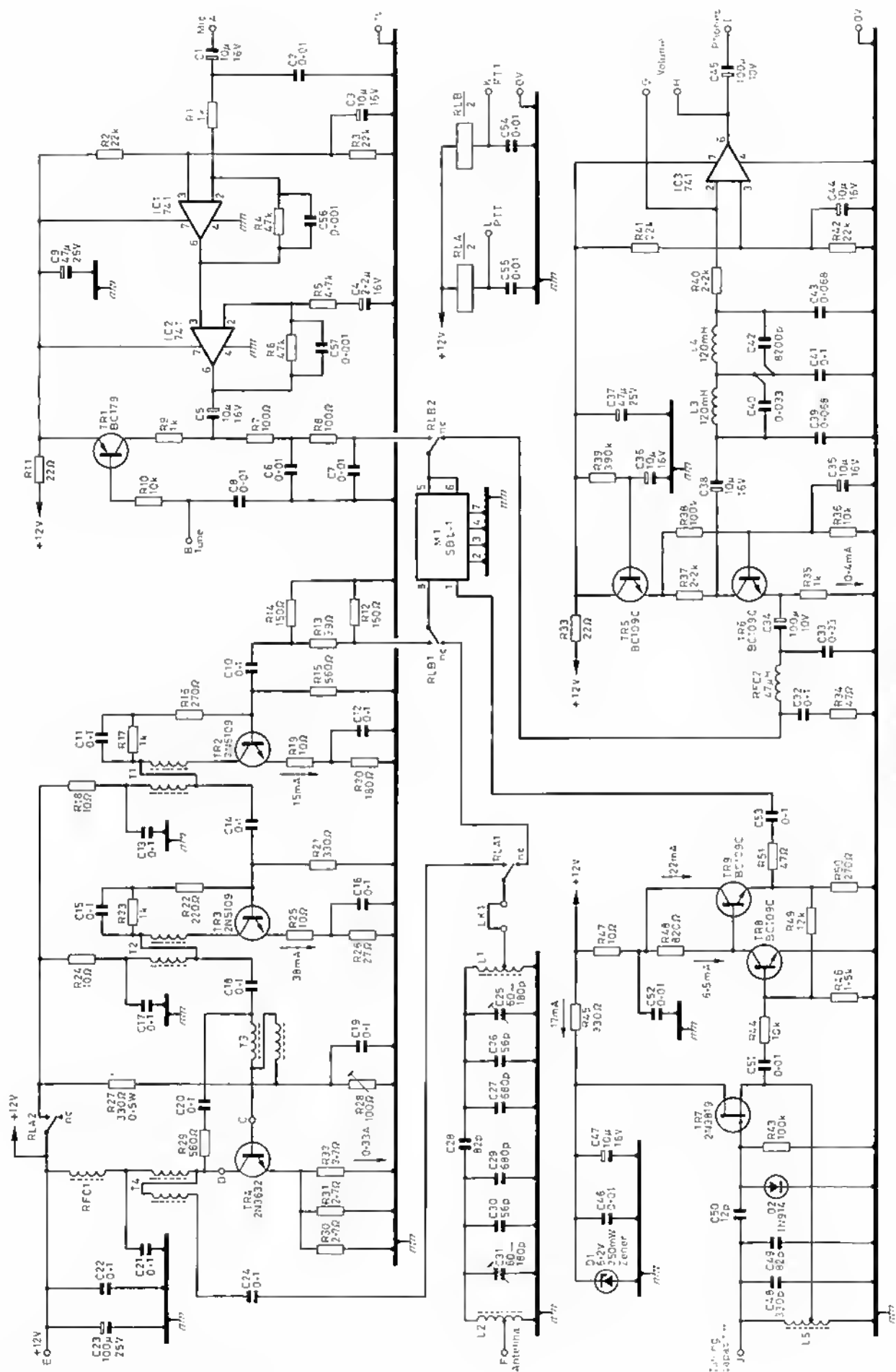


Fig 1. Circuit diagram

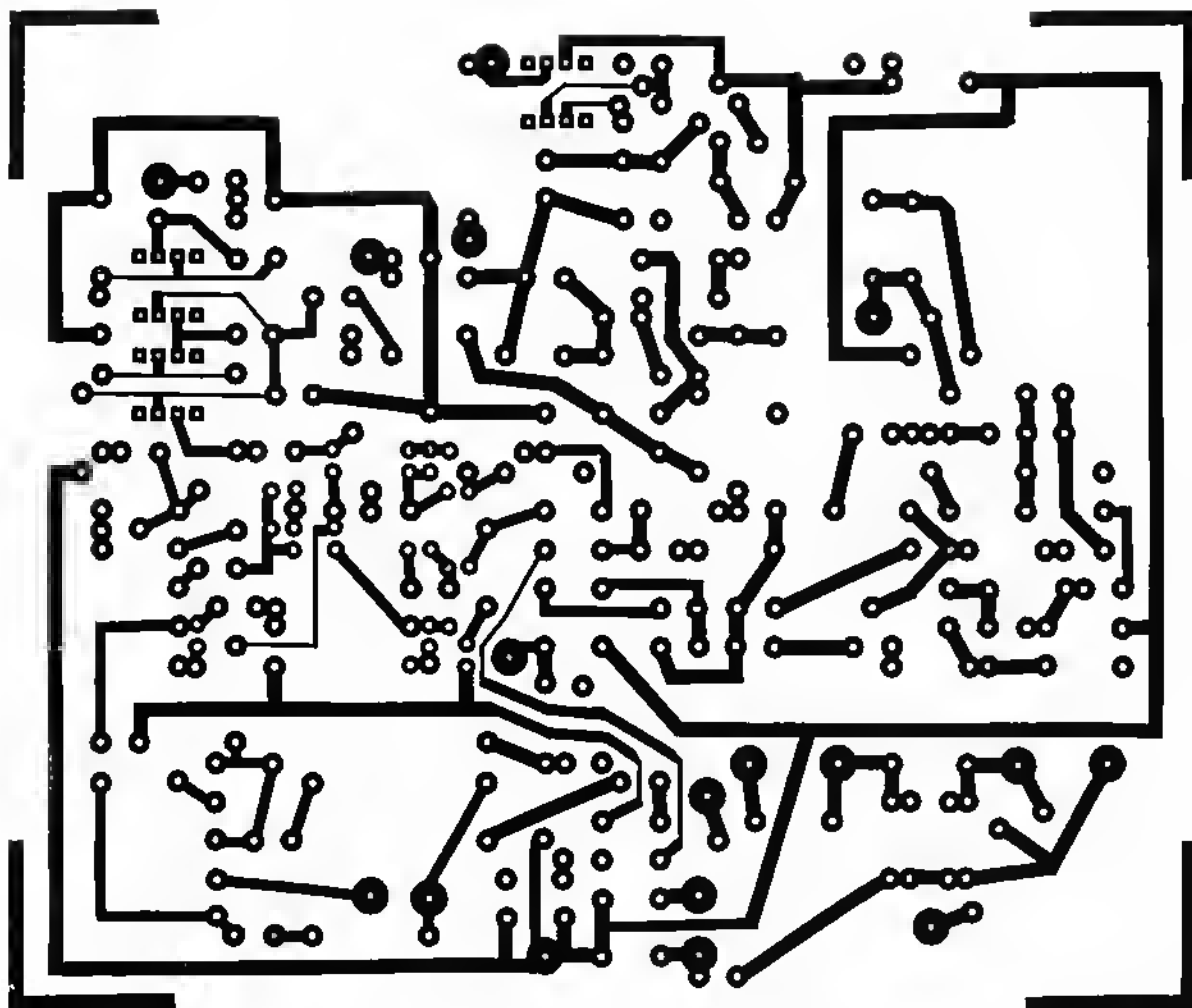


Fig 2. PCB layout

At the heart of the transceiver is a Hartley vfo comprising TR7 and associated components. The supply to this stage is stabilised at 6.2V by zener diode D1 and decoupled by C46 and C47. It is important for best stability that the "type 6" core material is used for L5 as this has the lowest temperature coefficient of permeability. Output from the vfo is taken from the low impedance tap on L5.

The vfo buffer is a feedback amplifier comprising TR8 and TR9. The input impedance of this buffer is well-defined by R44 and presents little loading of the vfo. Its gain is set by the ratio R49/R44, and R51 has been included to define the source resistance of this stage at approximately 50Ω.

Change-over between transmit and receive is accomplished by two dplit relays which are energised when the ptt lines are grounded. A cw signal for tuning purposes can be generated by grounding the TUNE pin—this switches on TR1, which in turn unbalances the mixer, allowing carrier to leak through to the driver and pa stages.

### Construction

The transceiver is constructed on a single 6 by 5in pcb. The artwork, component layout and wiring diagram are shown in Figs 2-4 respectively. The pcb is double-sided—the top (component) surface being a continuous groundplane of matched copper.

Without the facility to plate-through holes, some care needs to be taken that components are grounded correctly. Where a component lead is not grounded, a small area of copper must be removed from the groundplane, using a "spot-cutter" or a small twist drill. Where a component lead needs to be grounded, the copper should not be removed and the lead should be soldered to the groundplane as well as to the pad on the underside. This is easy to achieve with axial-lead components (resistors, diodes etc) but can be difficult with radial-lead components. In most cases the pcb layout overcomes this by tracking radial leads to ground via nearby resistor leads. A careful look at the circuit diagram as each component is located will soon show what is needed.

Remember to put in a wire link between pins L and K, and in position LK1 I used screened cable for connecting pins G and H to the volume

control—connect the outer to pin H. There are no pcb pads for C56 and C57, so these capacitors should be soldered directly across R4 and R6 respectively. TR4 must be adequately heat-sunk as it dissipates almost 4W even under no-drive conditions. I bolted TR4 through the rear panel to a 1.5 by 2.5in finned heat-sink. Resistors R30-R32 are soldered directly between the emitter of TR4 and the groundplane.

It is important that the vfo coil, L5, be mechanically stable. Ensure that it is wound tightly and fixed rigidly to the pcb; I "sandwiched" the coil between two perspex discs and bolted through the discs to the pcb. Also be sure to use rigid heavy-gauge wire for connecting to C58. I used a 6:1 vernier slow-motion drive which, with the limited tuning range of 100kHz, provides acceptable bandwidth; the 0-100 vernier scale (0 = 1.900MHz, 100 = 2.000MHz) gives a surprisingly accurate read-out of frequency, the worst-case error being 1kHz across the tuning range.

The broadband transformers, T1-T4, are wound by twisting together two lengths of 22swg enamelled copper wire. The twisted pair is then either wound on a ferrite toroidal core (T1 and T2), or wound through ferrite double-holed cores (T3 and T4). Identify the start and finish of each winding using an ohmmeter—connect the start of one wire to the finish of the other to form the centre tap (see Figs 5 and 6 for more detail). All transformers and the bandpass filter coils were secured in the pcb with adhesive.

Fabricated all of the transceiver, other than the top and bottom panels, by soldering together double-sided pcb materials. It is vital to have a good screen between the pa and the vfo otherwise the transmitter will frequency modulate badly. I used 2in high screens around the pa and vfo areas, and included a screen at the front of the vfo compartment on which to mount C58. If you use lower screens you may need to put a lid over the vfo: cut a tightly-fitting piece of pcb material and bolt it in position to four nuts soldered into the corners of the vfo compartment.

### Alignment

Check the pcb thoroughly for correct placement of components and absence of solder "bridges".

Turn the volume control fully counter-clockwise, the TUNE switch to the



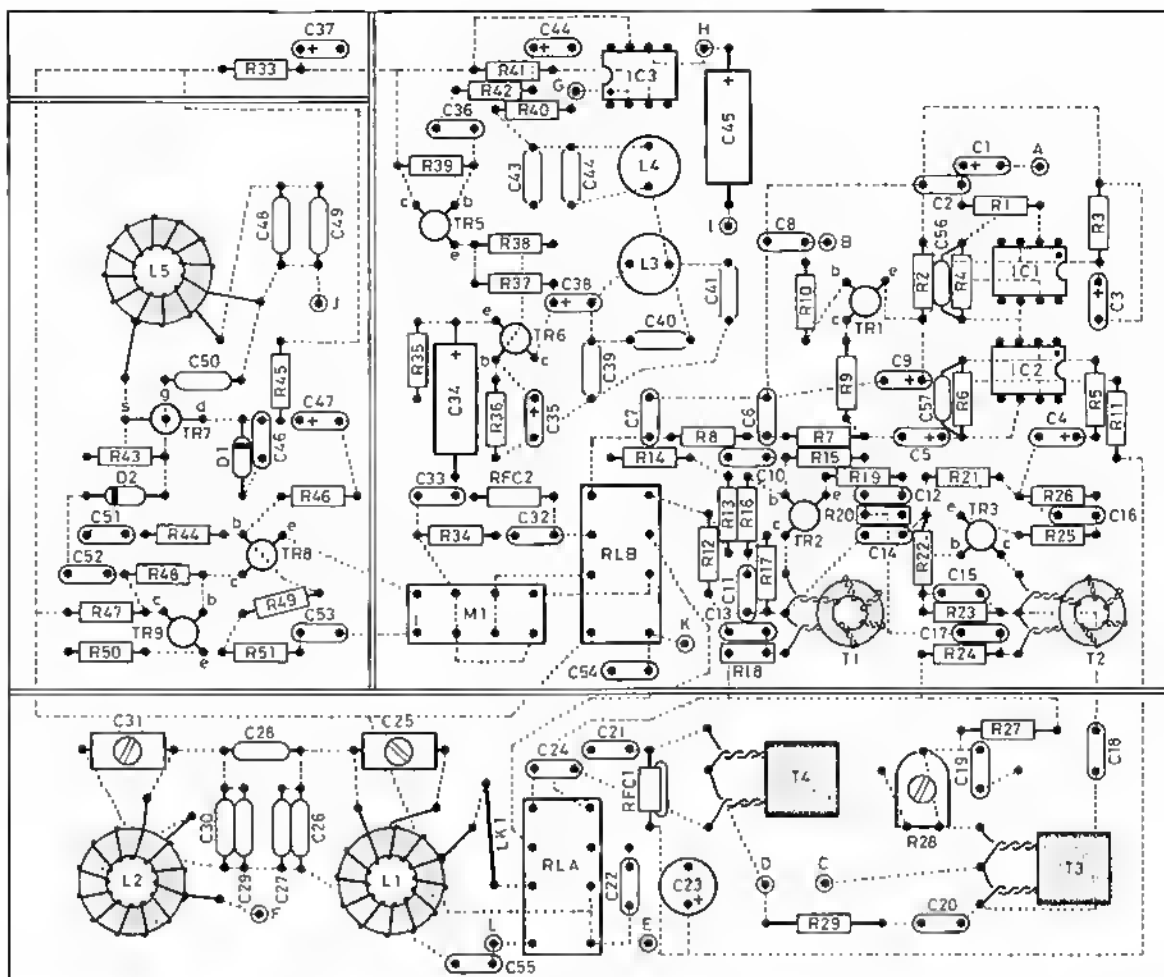


Fig 3. Component layout

off position and R28 fully counter-clockwise. Connect the transceiver to a 12V supply and switch on. Check that the current drawn from the supply is about 50mA.

Check the frequency of the vfo either by using a frequency counter connected to the source of TR7, or by monitoring the vfo on another receiver. With C58 set to mid-position, the frequency should be about 1.95MHz; if it is very different, you can adjust L5 slightly by spreading or squeezing together the turns. Alternatively, major adjustments can be made by substituting alternative values for C49. Check that the range of the vfo is about 1.9 to 2.0MHz.

Plug in a pair of headphones and slowly advance the volume control; you should hear receiver noise (a "hissing" sound). If you have a signal generator, set it to 1.95MHz and connect it to the antenna socket; if not, you will have to connect the transceiver to an antenna and make the next adjustment using an off-air received signal. Tune to a signal at 1.95MHz and alternately adjust C25 and C31 for a peak in its level.

Connect the transceiver to a 50Ω power meter, or through an SWR bridge to

a 50Ω load. Plug in a low-impedance microphone and operate the ptt switch. Note the current drawn from the supply—it should be about 200mA. Slowly turn R28 clockwise and note that the supply current increases; adjust R28 until the supply current has increased by 330mA. Release the ptt switch and operate the TUNE switch; the power meter should indicate between 1 and 2W.

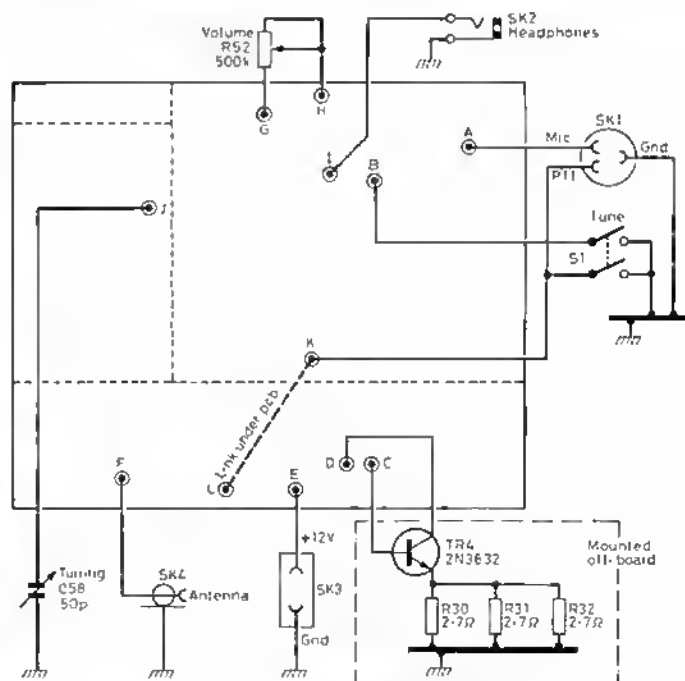
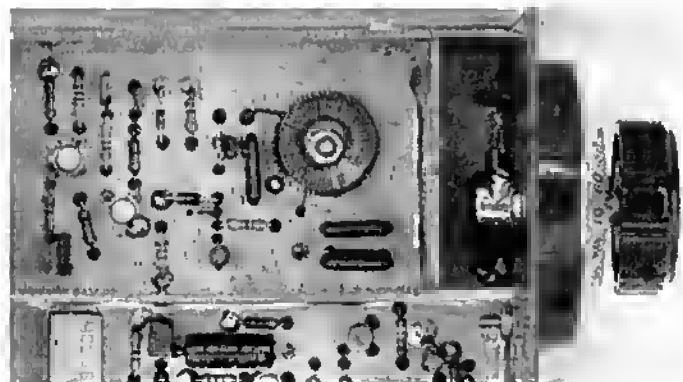


Fig 4. Wiring diagram



Detail of top view with C58 removed to show mounting arrangement of L5

## Components list

R1, 9, 17, 23, 35	1kΩ	C1, 3, 5, 35, 36, 38, 44,	10µF 16V tantal bead
R2, 3, 41, 42	22kΩ	47	
R4, 6	47kΩ	C2, 6, 7, 8, 46, 51, 52,	0.01µF ceramic
R5	4.7kΩ	S4, 55	2.2µF 16V tantal bead
R7, 8	100Ω	C4	47µF 25V tantal bead
R10, 38, 44	10kΩ	C9, 37	
R11, 33	22Ω	C10, 11, 12, 13, 14, 15,	0.1µF ceramic
R12, 14	150Ω	16, 17, 18, 19, 20, 21,	100µF 25V elect
R13	39Ω	22, 24, 32, 53	60-180pF trimmer (Cirkit 06-18006)
R15, 29	560Ω	C23	56pF silver mica
R16, 50	270Ω	C25, 31	680pF silver mica
R18, 19, 24, 25, 47	10Ω		82pF silver mica
R20	180Ω	C26, 30	0.33µF
R21, 45	330Ω	C27, 29	100µF 10V elect
R22	220Ω	C28	0.068µF
R26	27Ω	C33	0.033µF
R27	330Ω 0.5W	C34, 45	0.1µF polystyrene
R28	100Ω praseol	C39, 43	8200pF silver mica
R30, 31, 32	2.7kΩ	C40	330pF silver mica
R34, 51	47Ω	C41	82pF silver mica
R37, 40	2.2kΩ	C42	12pF silver mica
R38, 43	100kΩ	C48	0.001µF ceramic
R39	390kΩ	C49	50pF air-spaced variable, SLC law (Maplin FF45Y)
R48	1.5kΩ	C50	
R48	820Ω	C56, 57	
R49	12kΩ	C58	
R52	500kΩ log pot		

L1, 2	371 on T68-2 core lapped at 71 from ground
L3, 4	120mH (eg Cirkit 34-12402)
LS	571 on T68-6 core lapped at 141 from ground
RFC1	21 on small ferrite bead
RFC2	47µH choke
T1, 2	101 twisted wire on 10mm od ferrite toroidal core. Al = 1µH/1 (eg SEI type MM622). See Fig 5.
T3, 4	41 twisted wire on two 2-hole ferrite cores. Al = 4µH/turn (eg Mullard FX2754). See Fig 6.
TR1	BC179
TR2, 3	2N5109 or 2N3866
TR4	2N3632 (see text)
TR5, 8, 9	BC109C
TR7	2N3819

Q1	6-2V 250mW zener
Q2	1N914
IC1, 2, 3	741 op-amp
M1	Mini-circuits SBL-1 double-balanced mixer
RLA, B	DPDT 12V relay (eg RS Electromail 346-845)
SK1	Microphone socket
SK2	Headphone socket
SK3	DC power socket (eg Maplin YX34M)
SK4	Antenna socket
S1	DPDT toggle switch

**Miscellaneous**  
Slow-motion drive for C58 (eg Maplin RX40T)  
Heat-sink approx 1.5 by 2.5in  
Knob for R52

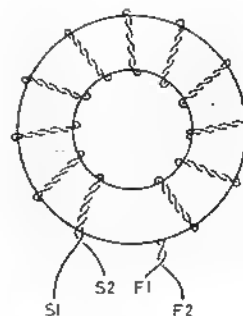


Fig 5. Winding details of T1 and T2. Connect S2 and F1 to form the centre tap. Note that the two wires are twisted together before winding. S1, F1: Start and finish respectively of winding 1. S2, F2: Start and finish respectively of winding 2. Core: 10mm od Ferrite toroid

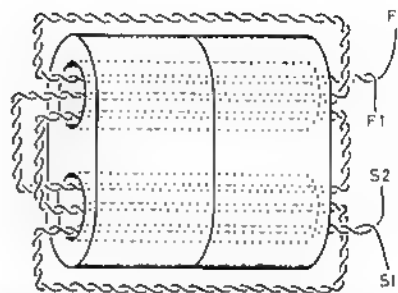


Fig 6. Winding details of T3 and T4. Connect S2 and F1 to form the centre tap. Note that the two wires are twisted together before winding. S1, F1: Start and finish respectively of winding 1. S2, F2: Start and finish respectively of winding 2. Core: Two 2-hole cores slacked end-to-end

At this stage, final adjustments can be made to C25 and C31. Swing the vfo from end to end of its range and note the variation in output power. The desired response is a slight peak in power at either end of the vfo range with a slight dip at mid-range. It should be possible to achieve this by successive adjustments to C25 and C31. For those of you lucky enough to have access to a spectrum analyser and tracking generator, LK1 was included to allow isolation of the bandpass filter.

If you have any problems, refer to Tables 1-3 which show typical ac and dc voltages around the circuit. If necessary, you can tailor the gain of IC2 to suit the sensitivity of your microphone by changing the value of R5.

## Final thoughts

In retrospect it would have been useful to have included the lowpass filter (L3, L4, C39-C43) in the transmit audio path in order to further restrict the bandwidth. Normally the roll-off achieved by C57 and C56 combined with the low output power means that you are unlikely to cause problems for adjacent QSOs. However, when using a 200ft vertical antenna during portable operation, the transceiver puts out a potent signal and a reduction in bandwidth would then be more "neighbourly".

A few facilities could be added fairly easily using the TUNE pin as a keying point. You would need to add rit facilities—probably by placing a varactor diode between TR7 source and ground. You might also consider changing to a bandpass audio filter rather than a lowpass audio filter in the receiver.

The transceiver can be adapted for other bands by changing the vfo components and the bandpass filter components—all other circuitry is broadband. You will need to worry more about vfo stability as you increase frequency, and you may find that the gain of the vfo buffer falls—you can overcome this by decreasing the value of R44. The noise figure of the receiver is adequate for operation on the lower frequency bands but on 14MHz and above you will probably need a preamplifier. Those who enjoy experimentation might try changing the vfo to a vxo, adding a preamplifier to the receiver, and seeing if operation on 50MHz is possible!

Finally, it has been interesting to note that, despite theory, with careful tuning it is quite possible to resolve dsb signals on the direct-conversion receiver.

## Reference

(1) "Wideband linear amplifier", J A Koehler, VE5FP, *Ham Radio* January 1976.

Table 1. Bipolar transistor dc voltages (with 12.2V supply)

	Emitter	Base	Collector	Note
TR1	12.2V	11.6V	11.8V	Tune switch operated
TR2	2.85V	3.6V	12V	Transmit
TR3	1.4V	2.15V	11.6V	Transmit
TR4	0.3V	1V	12.2V	Transmit
TR5	11.2V	11.8V	12.2V	
TR6	0.4V	1V	10.3V	
TR8	0V	0.65V	6.75V	
TR9	6V	6.75V	12V	

Table 2. FET dc voltages (with 12.2V supply)

	Source	Gate	Drain
TR7	0V	0V	6.2V

Table 3. AC voltages

Circuit node	AC voltage	Note
TR7 source	2.6V p/p	1.8MHz ri
TR9 emitter	2.6V p/p	1.8MHz rf
Mic input	4mV p/p	Transmit audio
IC1 pin 6	200mV p/p	Transmit audio
IC2 pin 6	2.2V p/p	Transmit dsb rf
TR2 base	200mV p/p	Transmit dsb rf
TR4 collector	15V p/p	Transmit dsb rf
An1 (50Ω)	30V p/p	Transmit dsb rf

# TWO ANTENNAS IN THE SPACE OF ONE

Len Uphill, G3UCE\*

MOVING to my present QTH over three years ago, the problem of erecting antennas in a dense residential area was immediately encountered. A start was made, however, with erecting a low doublet about 20ft high and 100ft long in the inverted mode. As this raised no objections, the height slowly increased over the next six months until its present height of 30ft was reached. This antenna was centre-fed with slotted 300Ω feeder, and worked very well on all bands 1.8 to 28MHz, although I felt that something a little more special was needed for the 14, 21 and 28MHz bands. A beam being definitely out of the question, the next best thing—a vertical—was considered.

The 30ft scaffold-post mast holding the inverted-V being reasonably clear of high objects and 50ft from the bungalow, it was decided to use this as a suitable vertical. The problem was: how to carry on using the mast as a support for the existing wire antenna? It was decided to make the doublet into a long-wire antenna by joining the two halves of the doublet together; this did away with the feeder downlead, thereby removing the problem of capacitive and inductive coupling in the mast. A 2ft length of pvc tubing was fitted at the top of the mast, and the wire antenna lifted 2ft higher up, which further isolated the mast from the existing antenna (Fig 1).

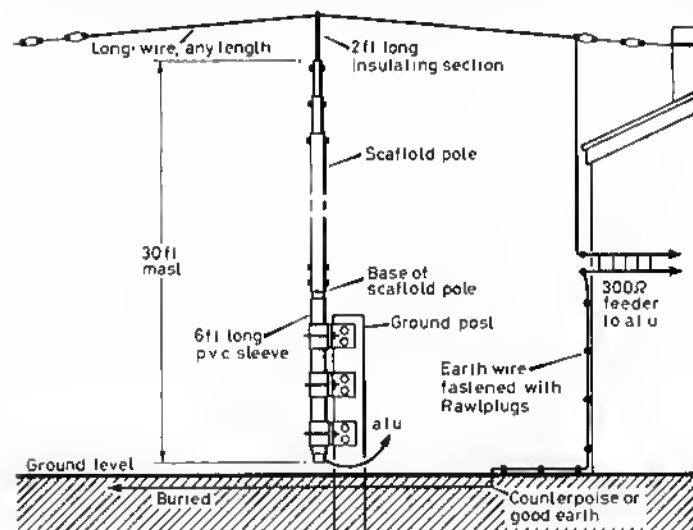


Fig 1. General arrangement of the antenna system

This diagram also shows a different method of feeding the end-fed antenna. The existing 300Ω feeder into the shack was cut outside the bungalow, one side of the feeder going up to the end-fed, the other side of the feeder going down to a good earth. Because of large areas of concrete, a wire was taken down the wall and across the concrete, being fastened with Rawlplugs every 2ft or so, until the garden was reached, where it was then buried under the lawn for the full length of the wire antenna, making an effective counterpoise. This end-fed system works exceedingly well and the atu happily tunes all bands 1.8-28MHz.

## Mast insulation

The base of the mast being a 2in alloy scaffold pole, it was initially fixed to the wooden ground-post with three heavy-duty brackets and three U-clamps, as shown in Fig 2, and as high voltages would be present at the mast base, good

insulation of the mast was necessary. An 8ft length of, approximately, 1.5in external diameter steel tubing was inserted into the base of the mast, packed with alloy strips to provide a tight fit, and bolted with two 2.5 by 0.37in bolts. A length of pvc tubing 1.62in id from a plumber's shop was slid over the steel tube, and two lengths approximately 3in long of this pvc were cut and slit up the side, enabling them to be opened and slid over the 6ft length of pvc to the points where the original U-clamps would be fitted.

The mast was re-erected with the original U-clamps, having two thicknesses of the pvc tube under each clamp. This, of course, increased its height by 6ft, so a reduction was made in the top part of the mast to keep the height at 30ft.

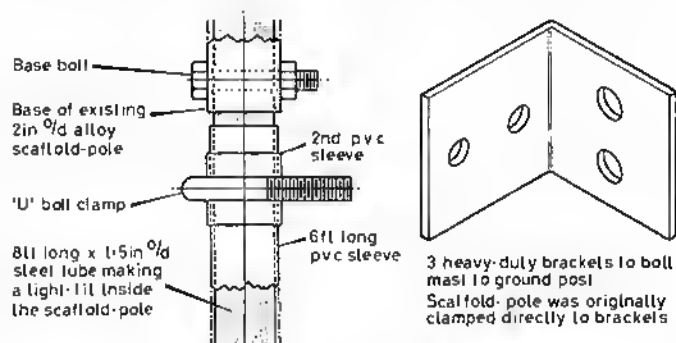


Fig 2. Base lifting arrangement

It was decided that a remote atu controlled by three relays and fed by 50Ω coaxial cable would be used at the base of the mast. Before deciding on the type and layout this would take, a suitable all-weather container had to be found. Apart from complete weather-proofing, ease of access for adjustments etc was also a requirement. After much searching, the ideal was eventually found in the form of a plastic bread bin, with the clip-on lid, used upside down; the bin itself being the removable cover. The lid of the bin was fastened to a wooden shelf, mounted horizontally with the aid of two 6in angle brackets to the ground post. The size of the bread bin is shown in Fig 3. A 12in expanding luggage-retainer with hooks at each end holds the bin firmly in position, and stops any possibility of gales blowing it off.

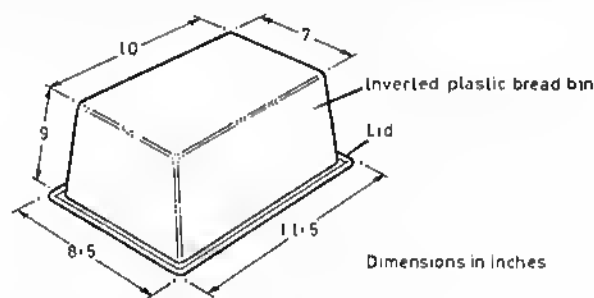


Fig 3. Dimensions of bread-bin container

This bin has had the full force of the garden hose on it, yet remains totally dry inside. A piece of wood 10 by 7in, with the corners cut off, fits inside the lid. This is screwed through the lid to the shelf on which it rests, and holds the plastic lid very rigidly and provides the base for the atu.

**Safety note.** Although the mast is decoupled to earth, it must be realised that high rf voltages will occur at the base of the mast, especially if a 400W amplifier is used. The bottom 6ft of the mast is admittedly covered by an insulating pvc sheath, but care must be taken to insulate the connection of mast to atu and precautions taken to avoid rf burns to people or animals.

## Construction of atu

Mounted vertically in the base with small angle brackets, is a sheet of rigid plastic insulating material, 9 by 7 by 0.19in, on which is mounted the coil, three 12V h-d relays, and three preset mica compression trimmers. The plastic sheet with the components is fixed to the base board, making sure that the bin cover does not foul it. The antenna mast is decoupled through a coil to earth, to discharge static, and several coils were wound and tried.

The coil eventually used is wound with the thickest solid-core wire available, in this case 12swg, and 13 turns were wound on to a 1.5in former, then slipped off and opened out to a length of 4.5in. The ends of the coil are soldered on in the heads of 2BA screws, and bolted to the top of the panel. Underneath the coil are mounted the three relays. Radio-Spares double-pole

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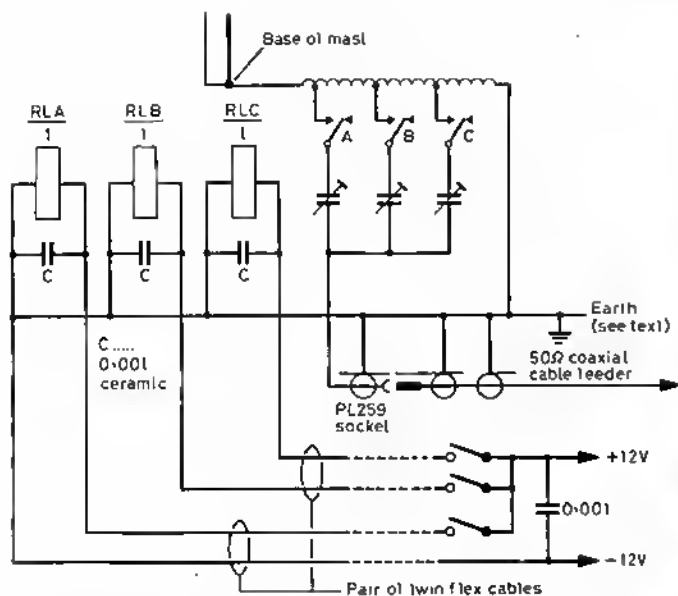


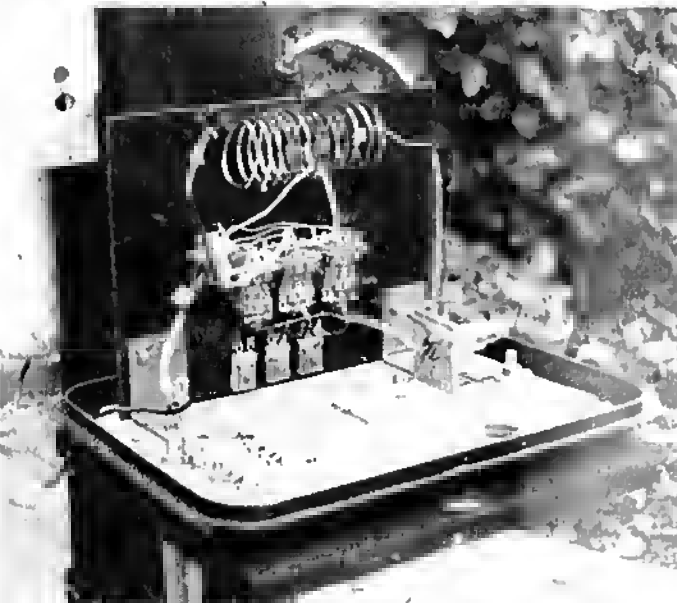
Fig 4. ATU circuit

open type 12V relays, with the contacts rated at 5A and the ten poles strapped together, are used. These easily carry 400W from the station linear amplifier.

Underneath the relays are fixed the preset mica capacitors. These are Radio-Spares 500pF (min capacitance 100pF). Subsequently it was found that the 28MHz band would not tune with one of these capacitors owing to the minimum capacitance, and it was replaced with a small 100pF air-spaced capacitor. Also mounted on the base board is an SO239 socket on a small bracket. The coaxial feed terminates in a PL259 plug, and this come up through a large hole, bored in the base board, into the socket. This enables the feeder to be disconnected and an swr meter fitted in circuit for tuning-up procedures.

Two pairs of plastic flex leads are run with the coaxial feed; one wire is common 12V negative, and the other three go to the relays with 12V positive. These are switched by a three-switch box in the shack from the station 12V supply. The switching wires are decoupled in earth at each end, with 0.001μF ceramic capacitors. With the relays having 110Ω coils, about 100mA will flow in the energised coil.

The atu is wired-up as shown in Fig 4. Flexible leads are used from the relays (the outside of coaxial cable suitably flattened) to permit their free operation. The earth consists of two ground rods originally put in with the ground post, and two radials for each band. These are mostly buried in the garden. It is also linked up with the counterpoise for the long wire antenna.



Interior of the atu



The bread-bin container fixed to mast

### Tuning up

Starting with 14MHz, feed a small amount of rf down the feeder from the station rig, with the swr meter in position at the base of the mast, and energise the 14MHz relay. The flexible lead from the relay must then be tried on successive turns of the coil, tuning the preset at the same time, until an swr of 1:1 is obtained, the lead then being soldered in position. The same tuning procedure is then carried out with the 21 and 28MHz relays.

The swr meter can now be removed and the meter placed in position. Due to the large size of the mast and consequent low "Q" of the vertical antenna, this low swr remains flat over the three bands, and is ideal in making the full output of 400W from the station linear, whatever part of the bands are required.

### Conclusions

The initial settings of the atu have never needed to be touched after nine months of use, and swrs remain at 1:1.

A recent addition is a 4ft by 0.5in alloy stub, fitted horizontally at the top of the mast, and at right angles to the long wire. This gives a slight top hat effect, increasing the height of the current nodes in the antenna.

The next thing to try with this antenna will be slanting wire reflectors or directors.

Considering the poor state of the hf bands over recent months, reports on 21MHz into South Africa, and 14MHz into North America, have been very good; 28MHz having not yet been used. An added bonus with this particular installation, is that it works well on 7MHz when the 21MHz switch is selected. □

### "A SPROGGY HUNT"—erratum

The author of this article (*Rad Com* July 1987, p487) writes: "In Fig 2, pin Nu 7 needs to be returned to the positive supply line through a choke. I used eight turns of 22 swg tinned copper formed to a diameter of 5mm.

"Apologies."

G2BKO

# Technical Topics

Pat Hawker, G3VA

THE APRIL ISSUE of *QST* devoted a couple of pages to a first "1987 Messy Shack Photo Contest" providing illustrations of a memorable collection of shacks crowded jam-tight with equipment, and workbenches littered with masses (or messes?) of leads, tools and instruments of all types. WA4HXZ was named owner of "the most functional messy shack"; W1AN "most creative use of space"; W2JMU "messiest workbench". The only European shack featured was that of Torfinn Horn, LA4OFA, credited as having a "messy shack with most potential". I should have entered!

All good fun and a space filler not to be taken seriously, you may be thinking. Yet the June issue reported that "the response to this article was overwhelming. The Messy Shack Contest generated more letters to the correspondence editor than any other feature in years".

Why should these photographs, so different from the tidied-up and neat displays of black boxes that one sees pictured in the amateur magazines these days have struck such a responsive chord? Was it mere nostalgia for the days when most amateur shacks looked like the furious efforts of a mad spider to spin a web of wires over open breadboard gear that somehow always remained prototypes? Or perhaps a reaction against those neat little transceivers smaller and less exciting than the family hi-fi? Or a heartwarming proof that there are still some shacks so overflowing with bits and pieces that it is only just possible for an operator to squeeze in?

There is plenty of evidence that many of those who knew and enjoyed amateur radio in days past regret the gradual phasing out of the old idea that an amateur was essentially an experimenter: the shack a place in which you gingerly touched bare wires to see if they were carrying 240V ac, harmless 6-3V or finger-burning rf. And gear was operated manually, *not* under microprocessor control.

Phil Horwood, G3FRB, is one of those who admits to increasing despondency about the way amateur radio is progressing. "How can a youngster get started these days with the ridiculous cost of commercially-made gear?" he asks. The answer surely depends on the extent to which youngsters can be persuaded that you do not need an all-singing, all-dancing black box to enjoy amateur radio. G3FRB believes the rot set in when the 144MHz Class B licence (the original Class B was for 420MHz upwards for which no commercial units were marketed) led to the black-box syndrome by forcing the beginner on to vhf rather than the traditional initiation with simple, often home-built but always "understandable" and "serviceable" equipment on 1.8, 3.5 or 7MHz. He would favour the introduction of an hf/vw "Novice" licence instead of Class B licences, but one can imagine the number of indignant letters to the editor if anyone attempted to say that no more Class B licences would be issued! And the Americans grumble that 5,000 of their "novices" drop out each year without, in many cases, ever getting on the air—and, messy shack contests apart, the black-box syndrome is not unknown in the USA!

But certainly the growing interest in "replica" equipment of the 'thirties reflects some disenchantment with current practices, aptly summed up in some doggerel verse from *Radio-ZS* by A. Buchan, ZS5NZ, which I have taken the liberty of shortening and slightly modifying:

*The old-timer awoke with a tear in his eye  
He'd been dreaming again of the days long gone by,  
Of racks and of panels of regular size  
And calls reaching out to some foreign skies  
The heat and the glow of the bright 813,  
And the open-wire feeder outside he could see  
The dx a plenty the sunspots would bring  
And all that was needed — a piece of wet string,  
On the key of bright brass a CQ he'd send  
And back would come China and dx no end.*

*Then he looked at his new transistorised set  
With its miniature dials so easy to net,  
Who wants all this black new-fangled gear?  
Where are the homebrews of yesteryear?*

Professor Cyril Northcote Parkinson, author of Parkinson's Law, has warned of the effects of the growing automation and computerisation of our lives (and shacks?). He has formulated a new law: "The chief product of a highly-automated society is a widespread and deepening sense of boredom."

People should be forbidden by law to work more than three days a week at computers or other kinds of automated equipment."

## Variometers ancient and modern

The reminder by Kuri Grey, VE2UG, of the use by Lorenz and Collins Radio of variometers for hf marine and aeronautical transmitters and their continued use at vhf (77 June 1987, p409) stirred some memories of the advantages, particularly in terms of trouble-free service, that these components had over the "roller-coaster" variable inductors that succeeded them on hf.

Both George Cripps, G3DWW, and Phil Horwood, G3FRB, point out that an hf variometer was used in the No 19 set, the standard British Army vehicle set of the second world war. G3DWW writes: "I have for many years made use of a No 19 set variometer as a most convenient variable loading coil. These were designed for use in the 2 to 8MHz range, and can certainly load up these frequencies effectively on to an 8ft whip antenna . . . *Marine Radio Manual* by Danielson and Mayoh (George Newnes, 1966) shows a number of marine transmitters using variometers for antenna loading in the 500kHz mf band. At the Rugby Radio (GBR) vhf (16kHz) transmitter the variometers are 16ft diameter hexagonal spiders wound with Litz cable, and the antenna current is 900A with 270kV rf at the antenna feedthrough point! Roller-coasters in a marine environment and salty atmosphere might prove dodgy."

Checking my copy of *Marine Radio Manual*, I note that among the transmitters using mf variometers were the Marconi Oceanspan, Marconi Salvor 2, Redifon G47B and G80, IMR 62. Apart from the question of a vulnerable sliding contact, one could imagine that the construction of a "roller-coaster" with sufficient turns to cope with 500kHz whip antennas would not be easy, and variometers may still be standard practice for this application.

Phil Horwood, G3FRB, also puts in a good word for the variometers used in the No 19 tank sets. He cannot recall one ever going wrong, something that could not be said of other components in the early production of the No 19 which had an altogether less happy record. Like other one-time members of REME, he says: "I would like a pound for every 19-set I repaired or for every Sherman or Churchill tank I climbed out of." He still feels cross that few people associate the Army with radio. There were, he points out, as many radio people in REME as in the RAF and RN combined. I must admit that my only wartime encounter with REME was once trying unsuccessfully to get them to repair a 150W Onan petrol-electric generator belonging to Special Communications. Perhaps if I had taken them a No 19 set I would have been better served!

## The linear variable inductor—a modern variometer?

An alternative form of continuously-variable inductor, more suited to small-signal applications than high-power antenna matching, is permeability tuning in which dust-iron cores are physically moved in and out of the inductors, a technique used very successfully by Collins Radio for receivers and vfos.

A new form of "quasi-linear controllable inductor" has been described by A S Kislovski of Hasler Ltd (Switzerland) in the prestigious *Proc IEEE* (February 1987, pp267-9). This is a "linear variable inductor (lvi)" for which is forecast an extremely wide spectrum of potential applications, though I have no idea as to whether this is likely to include radio communication engineering. A S Kislovski writes: "It is obvious that the new component will prove an extremely versatile tool in the hands of electronic power engineers. At the same time, it is felt that it also represents a sort of challenge to all creative electronic engineers—to explore the new horizons which it has opened." Unusually emotive words to find in *Proc IEEE*! It is claimed that the lvi "fills the gap which has existed among the components featuring electronically variable fundamental electric properties: resistance, capacitance and inductance."

Basically the lvi is a magnetic component using ferromagnetic core material, its permeability being externally controlled by a bias field produced by an additional winding. A S Kislovski writes: "A bias field colinear with the signal field has until now not been considered as a suitable means for the obtaining of a linear variable inductance. The reasons are two-fold. First, a

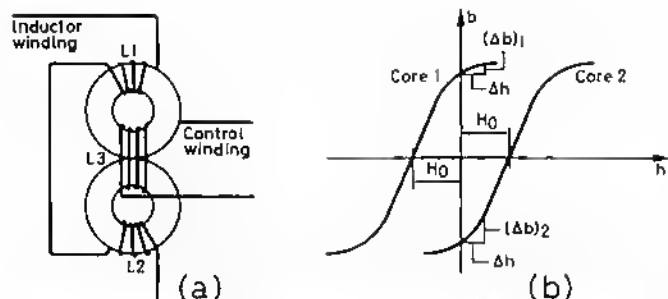


Fig 1. (a) Construction of the electronically-variable linear inductor (LI) as described by A S Kiselevskii of Hestor Ltd. (b) Operating points of the two loaded cores under the influence of the control bias current in L3

strong coupling between the bias and the signal fields seems to be inevitable; second, the linearity range of the inductance is severely limited."

The arrangement shown in Fig 1(a) virtually eliminates the first of these problems and greatly reduces the second. Windings L1 and L2 are identical and wound on separate, preferably toroidal cores of ferromagnetic material. Winding L3, the control winding, is wound over both cores. Windings L1 and L2 are connected in series but produce opposing fluxes in L3, so that there is no or very little coupling between the inductance L1 + L2 and L3. When there is no current in L3, the total inductance of the component is thus L1 + L2, but as current in L3 is increased, the biasing current displaces the operating point of the cores along their hysteresis curves (Fig 1(b)) and the effective inductance of L1 and L2 becomes increasingly series-opposing in a linearly-controllable fashion, so that their effective inductance falls. It is claimed that the linear variation of inductance can extend in a range as high as 1 to more than 100. The Swiss experiments were carried out with two 13mm toroidal cores of 3E1 material, with L1 and L2 each comprising 30 turns and L3 10 turns, the bias current in L3 being adjusted from zero to several amperes.

I remain curious as to the extent to which this technique could be applied to practical rf applications at hf or vhf, using suitable dust-iron toroids, and at what power levels or perhaps only for small-signal applications? It would be interesting to have reports from anyone investigating this concept, which appears to offer the possibility of emerging as a modern form of electronically-controllable variometer. It could be that the system is intended for use only where there is no flowing in L1/L2 as well as L3, or alternatively where all windings are fed with rf at the same frequency. It would be worth finding out.

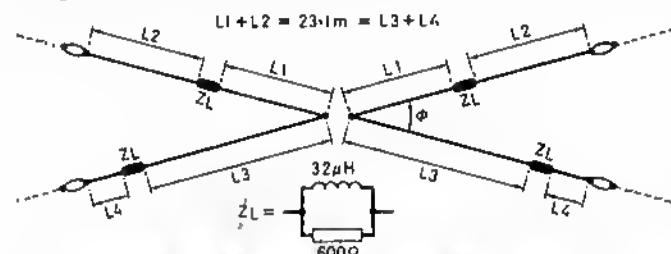


Fig 2. The 3 to 30MHz broadband resistive-loaded inverted-V antenna developed by Dr Brian Austin (G0GSF/ZS6BKW) and Andre Fourie, providing high radiation efficiency and low swr at frequencies down to 3MHz. Feedpoint impedance about 500Ω

### Resistive-loaded broadband antennas

77 (June 1987, p406) in discussing techniques for broadbanding dipole antennas, made brief reference to the recent work of Dr Brian Austin (G0GSF/ZS6BKW) and Andre Fourie in resistive-loaded antennas, including a new high-efficiency design covering the entire hf band 3 to 30MHz: Fig 2. This uses parallel inductive/resistive loading in much the same way as the "Australian dipole" but as an inverted-V type of "fat dipole" with diverging wires that would, incidentally, be easier to implement than the Australian dipole with its 1.8m spreaders. However, I omitted to include any information on the actual dimensions of this antenna.

G0GSF, noting the omission, writes: "The homebrew community will be pulling their hair out now that you have whetted their appetites by quoting its performance characteristics without giving the key dimensions! They are as follows:

$$\begin{aligned} L1 + L2 &= L3 + L4 = 23.1\text{m} \\ L1 &= 13.5\text{m (hence } L2 = 9.6\text{m)} \\ L3 &= 17\text{m (hence } L4 = 6.1\text{m)} \end{aligned}$$

"Whereas the included angle  $\phi$  does not markedly affect the vswr, the characteristic impedance of the feedline is dependent upon it to some extent. When  $\phi = 5^\circ$ ,  $Z_0$  (opt) = 500Ω, whereas  $\phi = 0^\circ$  requires  $Z_0$  (opt) = 400Ω.

The change is so slight that it is probably not really worth worrying about in practice."

With an overall element span of  $2 \times 23.1 = 46.2\text{m}$ , it could prove difficult to fit such a useful antenna into a back garden, though the inverted-V bow-tie form of construction allows the centre support to be on a roof in order to make use of both front and back gardens.

In my June 77 comments I noted that the T2FD was an early form of an antenna loaded resistively to increase bandwidth. Although some amateurs consider that (with a suitable aid) the T2FD does form an effective multi-band design, it was noted many years ago that the T2FD originally stemmed from a US Navy design intended only to broaden the bandwidth of a dipole by a relatively modest degree. Dr Austin comments:

"We certainly did examine the so-called T2FD configuration; both with the computer and experimentally (at least in measuring vswr). Our conclusions were that it is not an effective broadband configuration, and your term 'aperiodic multi-band' is probably far more accurate. Its vswr is certainly very peaky and nowhere near as flat as one American manufacturer would have his customers believe. This was confirmed by both the measured results and the computer prediction. However, when one examines radiation efficiency as well (as we clearly must) then its performance — or lack of it! — becomes really evident. At the 3MHz end it performs about as well as a resistor, rising thereafter in a series of sawtooth-like oscillations to about 70 percent at 18MHz, but with deep notches down to about 20 percent around 12 and 24MHz. These figures apply to an antenna 27.4m long and 0.46m between conductors, with nominally an 800Ω load, as would be given by the equations quoted in 77 September 1986 for a low-frequency cut-off of 1.8MHz. Scaling dimensions to operate from 3.5MHz would produce the more usual T2FD geometry. This research brought to light a number of important aspects and some of these will be published soon."

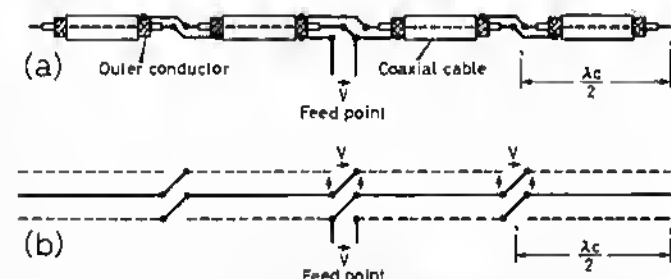


Fig 3. Basic geometry of the "coco" (coaxial collinear) antenna formed from a series of electrical quarter-wave sections of coaxial cable taking into account the velocity factor of the cable

### "Coco"—the coaxial collinear array

Some 15 years ago, 77 (September and November 1972) drew attention to the way in which coaxial collinear ("coco") antenna arrays (Fig 3) were being used professionally; not only for the comparatively well-known vertical vhf antennas having an omnidirectional horizontal radiation pattern and narrow vertical radiation pattern, but also as a transportable 26-element horizontally-polarised centred-fed array on 49-8MHz (Fig 4) described in *IEEE Trans on Ant & Prop* July 1972, pp513-6. The November 1972 77 included an example of a more conventional 144MHz vertical coco design by W6P1V (Fig 5), and a note from Dud Charnan, G6CJ, who recalled that the famous tv pioneer Alan Blumlein of EMI had tried, unsuccessfully, to make such a system work as early as 1935. Although 144MHz designs regularly turn up in amateur radio magazines, there is in my mind a question-mark over this approach. One could not guarantee 100 per cent success.

Recently, however, a detailed theoretical model together with computer simulations of its current distribution and measured performance characteristics have been published for 24- and 26-element coco antennas at 50MHz and for six- and eight-element coco antennas at 915MHz in a short paper by Thierry J Judasz (University of Colorado) and Warner L Ecklund and Ben B Balisey (US National Oceanic and Atmospheric Administration) in *IEEE Trans on Ant & Prop* (March 1987, pp327-31). Warner Ecklund was one of the authors of the 1972 paper noted above.

The paper recalls that large coco antenna arrays along the lines outlined in 1972 have been used successfully for many years. The mesosphere-stratosphere-troposphere radar at Poker Flat, Arkansas, has an antenna made of 256 separate coco antennas constructed from coaxial cable. The Jicamarca radar observatory in Peru has a 50MHz array of 1,536 separate coco antennas, in this case constructed from aluminium tubing. Commercial vertically-polarised coco communication antennas—for example, for two-way mobile radio—are available in the range 400 to 520MHz. Yet, in spite of its relatively wide usage, no thorough theoretical description has previously been published.



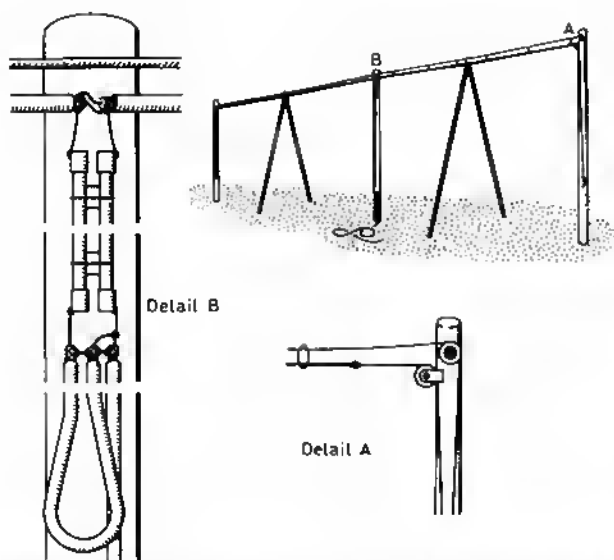


Fig 4. The 26-element portable coco array for 50MHz described in 1972 for mounting on three poles. The nylon messenger line and polyethylene slip rings used to connect to the antenna are shown in detail A and B shows lead arrangement consisting of balun and quarter-wave matching transformer. All electrical connections should be waterproofed.

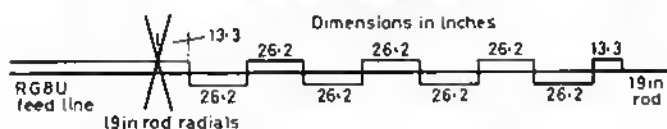


Fig 5. The vertical 144MHz collinear antenna shown horizontally

The IEEE paper includes a first-order mathematical "model" that would be of interest mainly to professional antenna engineers rather than radio amateurs. Nevertheless, the fact that computed and measured radiation patterns of the various coco arrays are in close agreement does at least give more confidence in this design approach. It is also interesting to note that a modification akin to that found in the W6PIV design (Fig 5) was found beneficial. To quote the paper:

"A modification of the 26-element 50MHz antenna yields a much smoother current and phase distribution. In this instance, the last element on both ends of the array has been replaced by a shunted section ( $\lambda/4$  in length) followed by a section of cable ( $\lambda/4$  in length) as discussed by Wheeler in 1956 and by Branner and Williams of RSRE in 1981. For short antennas, both model and measurements show that the final section should be somewhat shorter than  $\lambda/4$  (0.21  $\lambda$ , air) for a modified eight-element antenna at 915MHz... the result of the end treatment is to sharply reduce the sidelobe levels."

## More ideas on "straight" receivers

R B Kerr, GM4FDT, has been following recent *77* items on regenerative detectors and direct-conversion receivers with interest since this is an area where he has achieved considerable success with some novel designs, including the application of regenerative Q-multipliers to direct-conversion receivers, the use of sub-miniature (EF73/CV466) valves with low ht rails and

de powering of heaters, as well as ingenious exploitation of the "harmonic mixer" as originally introduced into d-c receivers by RA3AAE in the early 'seventies and described on a number of occasions in *77* and *ART*.

It has also been noted that the Q-multiplication characteristic of a regenerative detector can be applied to virtually any type of receiver front-end in order to improve pre-mixer or pre-detector selectivity. GM4FDT uses this technique in conjunction with a triodyne-type direct-conversion receiver comprising front-end Q-multiplier, balanced product detector, an amplifier with response shaping for cw and ssh (Fig 6); in addition the vfo can be switched off for a.m. reception with the Q-multiplier used to provide regenerative gain and selectivity.

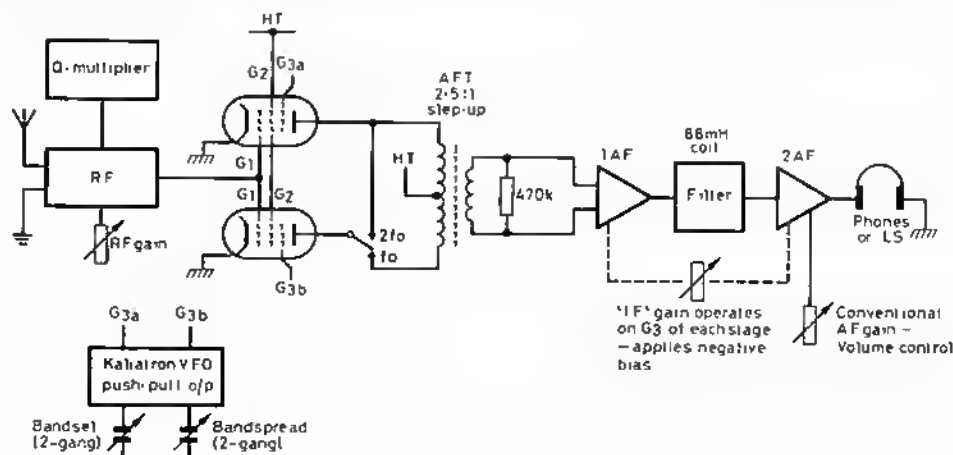
This receiver uses 10 EF73 subminiature (wire-ended) valves and one BC170 pnp transistor. The vfo normally operates at half the received frequency, but by switching the product detector from push-push ( $2f_o$ ) to push-pull ( $f_o$ ), where  $f_o$  is the vfo frequency, reception at a signal frequency of  $f_o$  is possible. Plug-in coils are used.

The Q-multiplier (Fig 7) has proved very effective and applies a negative resistance across the antenna tuned circuit, no extra feedback windings or taps are required. It could be applied to almost any receiver, perhaps with the addition of a series antenna capacitor to vary coupling and to avoid dead spots. The receiver can also operate at  $\times 3f_o$  (push-pull detector) or  $\times 4f_o$  (push-push); ie with the vfo at 3.33MHz one receives 10MHz signals or with vfo at 3.5MHz one receives 14MHz signals. A wide range of controllable af gain is achieved by adjusting the negative bias on the suppressor grids of three af stages.

GM4FDT finds that most of the problems peculiar to d-c receivers, such as microphone, modulation hum and vfo pulling, disappear when receiving in multiples of the vfo frequency at a slight reduction of gain, easily compensated for in the af stages. For headphone reception the entire receiver operates with an ht of 24 to 30V, for loudspeaker listening the ht for the final af stage is increased to 100V. As a result of considerable experimentation, he offers the following conclusions applicable to the construction of direct-conversion receivers:

- (1) TRF receivers work "as advertised" if well built and skillfully operated.
- (2) Valve heaters are best run on d.c. for "that silent background." GM4FDT runs his in series from a constant-current micad charger. This makes it possible to cope with the mild heater voltages of tv-type valves still readily available (often at no charge) such as the EF80, EF183, EF184, PCC189, PCC84, PC86 and PC88. The PC88 and PC86 (as used in the old valve rlf tv tuners) are grounded-grid triodes useful to 430MHz.
- (3) Triodyne d-c receivers operate best with harmonic mixers such as the RA3AAE product detector with anti-parallel diodes or push-pull valves, fets etc.
- (4) Many valves work well at low ht, particularly the ECC82, 6J4, 6J5, 6C5, EF73 (CV466), EF80 at 24V and similar down to 12V. Arcon valves such as the 955 and 956 will oscillate at 5V!
- (5) Variable antenna coupling and rf attenuators are very useful with virtually any receiver.
- (6) In any trf receiver there should be always one rf stage to minimise oscillator radiation, antenna "sirk-out" etc.
- (7) Audio response for ssh should be about 300 to 2,300Hz. For cw about 400Hz wide centred on your favourite cw tone.
- (8) Excellent decoupling, rf filtering and screening all help stability. Reducing the grid capacitor in a regenerative detector from the usual 100pF to about 10pF often improves ssh reception. It is also worth adjusting the value of the grid resistor for optimum results.
- (9) Plug-in coils and electrical handspread tuning are highly recommended.

Fig 6. Basic outline of the versatile direct-conversion receiver developed by GM4FDT using 10 sub-miniature valves and one pnp transistor



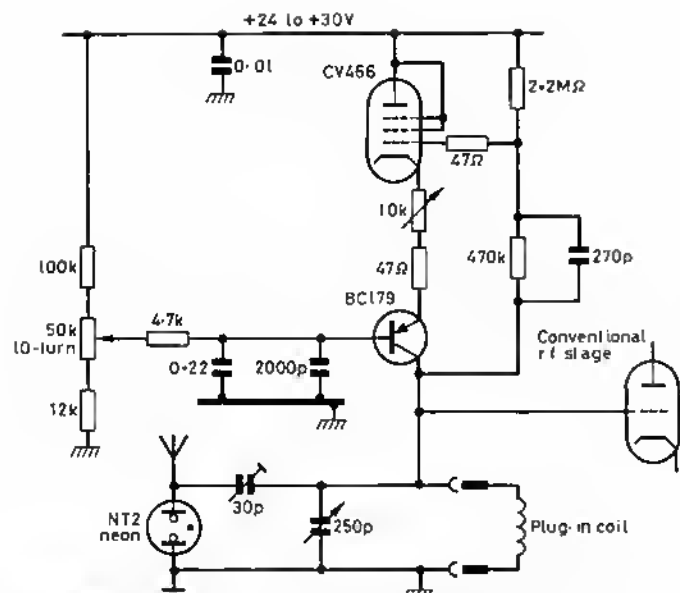


Fig 7. Negative-resistance Q-multiplier as used by GM4FDT but suitable for use with other types of receivers to increase pre-mixer selectivity

Apart from simplification, it is easy to wind more coils to cope with new hands etc.

(10) Finally, build it like a battleship!

In connection with (10), GM4FDT recalls that he once had a German military receiver made by Philips (I-v-2) that was later handed back to the makers who now have it in their museum in Eindhoven. The chassis was a die-cast box 0.25in thick, the massive coil turret with ceramic coil formers covered 15kHz to 18MHz and operated by a handwheel through two spur gears suitable for a lathe! The 220V ac PSU provided 100V ht and 4V dc with the ht supply smoothed with 1,000μF capacitors and lf choke. It also had a beautifully-made ganged capacitor and dial for tuning.

Certainly the mechanical construction and performance of the German military radios remains vividly in the minds of all of us who ever had an opportunity to use them. Personally, I recall a transmitter-receiver with a hf receiver fitted with a magnificent turret that I used occasionally in 1945-6. Admittedly some of the small passive components, such as capacitors, were less reliable than the mechanical parts.

### Vegetable oil and the resistor mystery

Bill Craig, G6JJ, believes there is a much simpler solution to G5RV's dummy-load resistor mystery (*TT* February, July) than that suggested by G4LYF. He writes:

"The resistors concerned are of carbon in a clay matrix. Like other ceramic materials they withstand chemical attack well. Mineral oils, which are paraffins, have good chemical stability. Vegetable oils, on the other hand, are glycerides of fatty acids which yield acid products over a period of time due to hydrolysis and oxidation. The reactions are accentuated at high ambient temperatures.

"When I discussed the matter with Dr Harold Emhlein, G1ANY, he was quick to point out that corrosion of the end connections was almost certainly the reason for the increased resistance of the dummy load. Such resistors usually have metallised ends around which are clamped metal bands through which the connections to the resistor are made.

"If 'good' connections are made to the ends of a resistor that has apparently increased in value, it will probably be found that the resistance of the element itself is unchanged."

Without getting into an argument between chemists, it would seem sensible when applying the coat of paint or clear varnish as suggested by G5RV (July) to make sure that you cover all the metallic parts as well.

### Tips and topics

With reference to recent items on linear and other high-power hf amplifiers using valves, P Carver, GW4WWE writes: "In view of the scarcity these days of high-voltage compact variable capacitors, readers may be interested to know that Jackson Brothers (a firm still making a large range of variable capacitors) make a variant of the 804-series capacitor (up to 220pF) capable of withstanding 1.5kV and having ptf interleaves fitted between the plates. Also available is a range of ptf tubular trimmers rated up to 2.5kV. Although the firm does not supply direct, Maplin Electronic Supplies of

Rayleigh, Essex, will take special orders of required items. Incidentally, the Jackson Bros catalogue makes good reading for those who may have been making a long and frustrating search for such components. They also have separate catalogues covering stand-off insulators, slow-motion drives, dials and gearing systems."

On a different but related topic, GW4WWE writes: "In regard to burned-out anode parasitic-suppression resistors, may I suggest that the problem is often caused by the use of carbon film resistors which, despite claims to the contrary, are sufficiently inductive to go up in smoke, particularly on 21 and 28MHz. The solution is to use carbon composition types which unfortunately are rapidly disappearing off the market. If anybody knows a source of composition resistors at a reasonable price perhaps they would let the rest of us know."

## RC14 FOLLOW-UP

The RC14 beginners' receiver (*Rad Com* June, pp397-9) has created a considerable amount of interest, and also fuelled some lively discussion on the subject of constructional projects aimed at the newcomer to amateur radio.

A complete kit of parts (and "complete" really does mean everything!) is available from Cirket, Park Lane, Broxbourne, Herts EN10 7NQ, tel 0992 444111, at a price of £36 incl VAT and carriage within the UK. Many readers would agree that the RC14 kit represents very good value for money, but more experienced constructors may prefer to "do their own thing" and acquire parts separately. In order to make this possible, a copy of the RC14 assembly instructions (including coil winding details and a complete parts list) together with a pcb foil pattern may be obtained by sending a large self-addressed envelope to the editor at RSGB HQ. Artwork for a tuning scale is also available on request. We are informed by Cirket that they are now able to supply the RC14 pcb on its own at a price of £5.17 incl VAT and postage.

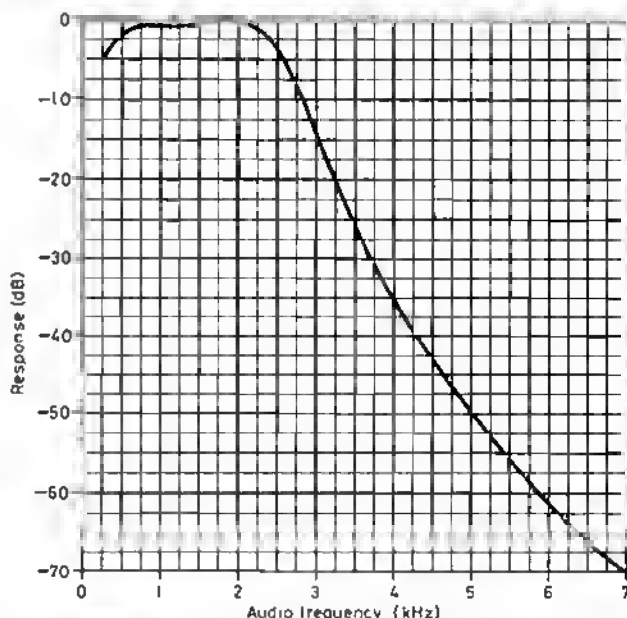


Fig 1. AF response of the RC14. Two near-identical third-order active filters (R5, C8+IC2b and IC3a with associated circuitry) combine to provide a steep initial roll-off above the commendably flat passband response. Note that the ultimate rejection exceeds 70dB

It will be of interest to potential constructors to know that tests on the RC14 by Peter Hart, G3SJK, show:

- (i) Sensitivity for 10dB S+N: 1μV
- (ii) Third-order intercept = +7dBm
- (iii) Two-tone dynamic range = 83dB
- (iv) Oscillator leakage out of antenna = -60dBm
- (v) AM rejection (for out-of-band signals at 30 per cent modulation depth). The level of the interfering a.m. signal was increased until the demodulated signal was equivalent to 1μV on channel signal. This level was -29dBm for close-in signals, rising to -22dBm for signals 2MHz hf of 14.1MHz and -19dBm for signals 2MHz lf.
- (vi) AF response—see Fig 1.

# NEWS BULLETIN

## 21<sup>st</sup> Century Licence

### RSGB makes its proposals

For more years than we care to remember we've been saying that a complete revision of the amateur licence was long overdue. The dreaded schedule fiasco of 1982 was the trigger for a thorough overhaul of the schedule to the amateur licence, which we finally achieved some time ago but ever since then we've been wanting to get on with the rest of the job. You'll remember that last year we asked for your input - well, it was all very carefully looked at and considered in depth and we've finally got to the proposal stage.

#### HISTORY LESSON:

Before we wade in and describe what the Society has in mind, it's worth looking at some of the background. Many of the "terms and conditions" of the present-day licence go back to the fifties and sixties, when tetrodes ruled OK, the transistor had only just ceased to be a gleam in the eyes of Mr Bardeen and Mr Brattain at Bell Telephone Laboratories and if you'd said "packet radio" to someone you'd have been whipped off smartish by the nice men in white coats. AX25? Data store-and-forward by satellite? SSB on 1 296 MHz? Any RF at all on 1 296 MHz? Er - no squire, never heard of those. It hardly needs saying that since those halcyon days electronics and radio have undergone pretty dramatic changes. For instance, the typical 1960s transmitter probably occupied most of a 19" rack, whereas the typical 1980s one occupies about as much space as the last edition of the Radio Communication Handbook and there probably isn't a tetrode in sight.

Equally, the little micro taking up about two square feet of your scribe's desk (and at which he is currently sitting typing this exquisite prose) has about the same

computing power as a 1960s mainframe filling a large air-conditioned room - and at the press of a few buttons the said prose shoots off down the telephone line to Headquarters with infinitely less trouble than printing it, packing it all up and taking it to the post office. In other words, the average home micro system has some pretty formidable computing power available. This means that data-related modes where the amateur radio station has a computer connected to it doing all kinds of clever things are rapidly growing in popularity.

If you wanted to be posh, you could say that the great growth of interest in amateur radio in recent years has been in what could be called the "system" aspects. Take repeaters, for example. Repeaters were originally established to assist mobiles. However, there are now repeaters catering for all sorts of specialist modes - teleprinter, data, television and packet radio. Amateur satellites provide transponders for a vast variety of modes, including delightful delicacies like data store-and-forward. The current licence doesn't exactly cater brilliantly for all these things.

#### LOOKING TO THE FUTURE:

In order to be able to excite the imagination of new recruits to this hobby of ours, the Society takes the view that we need to be able to offer them a lot more than just the basic ability to communicate. After all, in an age of ISD, Cellnet and even CB, communication from virtually anywhere isn't a novelty any more. We need to be able to offer the ability to experiment with new system techniques and applications - such as computer control, repeater networks, data modes, satellites, television and

other goodies which will no doubt emerge in the next few years. However, for the long-term good of the hobby it's necessary to maintain a balance. We need to ensure that radio amateurs have a sound basic knowledge of the RF and operating aspects of radio. This means ensuring that - for example - simple low-power CW operation is encouraged at least as much as hoopy hi-tech modes, not to mention ensuring that amateurs have enough theoretical and practical experience and knowledge to deal with RFI problems themselves.

Both the RSGB and other national societies take the view that some degree of co-ordination in matters like handplanning is essential if complete chaos is to be avoided. It's true that voluntary handplanning works well for 99% of the time. However, for devices such as repeaters, beacons and some varieties of unattended operation some legal backing seems to be a Good Idea. We've come to feel that national societies should be given the power to act in a similar manner to other private handplanning organisations such as public utilities and broadcasters; basically they're given a block of spectrum to manage and left to get on with it.

#### THE NITTY-GRITTY:

The RSGB is somewhat concerned that the experimental side of amateur radio is being hindered by the licence conditions which currently exist - not to mention the dreadfully long and tedious timescales involved when we go cap in hand to the DTI asking for anything which is a touch non-standard. With technology advancing at what sometimes seems to us to resemble Warp Factor Nine, we absolutely MUST make the licence less restrictive and more flexible.

(cont from previous page)

In the august words of a draft report from the Licensing Advisory Committee, "...the enthusiasm which drives people to try out new ideas and experiments is a scarce commodity, and it must not be discouraged by unnecessarily long administrative delays".

So what do we suggest?

1. To make the layout and wording of the licence clearer, more logical and easier to understand.
2. To group all aspects of a particular topic together in one place in the licence, which will also make future changes more straightforward.
3. To incorporate all the effects of past licence variations and interpretations into the main licence.
4. To bring the licence conditions into line with modern operating practices (do we really need a reference to spark sending apparatus in 1987?)
5. To introduce new facilities which are or will be required in the next decade or so.
6. To include some explanatory material where necessary.
7. To word the licence in more general terms in order to provide sufficient flexibility to permit amateurs to carry out experimental work (and make contributions to industry and the world at large) by the development of new services and techniques.
8. To produce a single licence document which caters for as many types of licence as possible - i.e. Class A, Class B, maritime, club, etc.
9. To produce a compact licence validation document, with the terms and conditions in a separate booklet.

#### WHAT THE SOCIETY IS PROPOSING:

In no particular order, these are the things which we'll be putting to the DTI as items for discussion and negotiation. We hasten to say that we didn't dream these up all by ourselves on a quiet day at Potters Bar; this is a synthesis of what the membership at large has been asking us for, put together after a lot of meetings and general shuffling of paperwork.

#### The licence itself -

1. First of all, it may sound like a small point but many of the existing licence conditions relate to the station rather than the licensee! It seems to us that the new licence needs to be more concerned with what the licensee can or can't do rather than the station itself, so we're proposing that the overall emphasis of the licence is changed to reflect this.

#### The purpose of the licence -

2. Incorporate the ITU wording defining the amateur service. This is a broader definition which includes "intercommunication" rather than just self-training.
3. Provide more opportunities for amateur radio to provide assistance to the community and increased facilities for Raynet operations and exercises.

4. Permit radio amateurs to communicate with stations in other services in any country in the event of natural emergencies in accordance with Resolution 640 of the Radio Regulations.

#### Location of station -

5. Reduce the number of categories of location by combining /A and /P and only using /P.
6. Removing the time limit of four weeks for /P operation.
7. Extend the standard licence to cover operation on a vessel in UK territorial waters.
8. Permit operation on public transport vehicles and vessels.
9. Issue the full maritime mobile licence as a letter of variation to the main licence.

#### Operators and access -

10. Allow holders of an amateur licence from any country to operate the station under supervision.
11. Allow members of the user services to operate the station under supervision during exercises, as well as in the course of live incidents.
12. Extend the greetings message facility currently available with GB callsigns to all licence holders.

13. Remove the clause requiring the licensee to prevent unauthorised persons from having access to the station. Preventing unauthorised operation should be sufficient.

14. Permit automatic control of the station.

15. Include low-power unattended operation in the general licence in certain parts of certain bands, in a similar fashion to the "low power" exemptions in a recent DTI booklet. This might cover "cordless" link or control applications around the station in addition to conventional operation.

#### Emissions -

16. Permit simultaneous operation on different frequencies using the station callsign; also permit telemetry/telecommand.

#### Identification -

17. Remove the need to give details of the location when not at the main address.
18. Reduce the frequency with which the callsign must be given.
19. Permit identification of the station to be in any permitted mode, with no maximum speed specified for Morse identification, but require identification in either telephony or Morse at less frequent intervals.

#### Messages -

20. Permit relaying of messages received from a licensed amateur station on to another amateur station.
21. Reduce the restrictions on recorded messages to cater for the storage and retransmission involved in data modes (AMTOR, MS, packet, etc).

#### Logging -

22. Various items on logging; reducing the details required when at a fixed location, removing the need for logging when mobile or "pedestrian portable" and permitting logging on storage media such as floppy disks.

## Administration -

23. Introduce a pocket-size licence validation card and have a separate booklet containing the licensing conditions.

24. Devise a method of ensuring that all amateurs are periodically notified of current licence conditions. At present there's a good chance that those mentioned in your original licence are horrifically out of date.

25. Include "notices in Radio Communication" in the official list of means by which the licence conditions can be varied.

26. Consider issuing "long-life" licences to reduce the administrative costs of renewal.

27. Request amateurs to permit publication of at least their town or county.

## Definition and interpretation -

28. Reduce ambiguity by defining the order of precedence of the licence and related documents, and outlining the "spirit" of the licence regulations.

29. Clarify the matter of precisely who can order the station to close down.

30. Include the relevant extracts from parts of legislation which are referred to in the licence (i.e. Wireless Telegraphy Acts, Radio Regulations, etc).

31. Interpret the bit about "secret codes and ciphers" so as not to prevent the use of new modulation techniques and data modes.

32. Introduce a "class 8" Amateur Radio Certificate for holders of an RAE pass slip.

## The schedule -

33. Specify power on CW by PEP in the same way as SSF

34. Reduce the restrictions on data modes in secondary allocations.

35. Increase the overall power limits from 26 dBW to 30 dBW.

36. Permit Class B licensees to identify in CW.

37. To avoid confusion, specify in the licence schedule those countries with which we have a CEPT or other reciprocal agreement.

38. Specify the "User Services".

39. Specify the schedule for operation in territorial waters and also for the full /MM licence.

40. Permit beacons and repeaters on 5.7 GHz.

41. Reduce the requirement for prior permission being required before operating at 24150-24250 MHz.

Another thing we ought to mention is that, even with this hyper-licence there's bound to be an increasing demand for facilities which aren't available as standard but which could be made available by "letters of variation". As we see it they would fall into three categories:-

a) facilities which can be made available to all amateurs by means of a general updating of the licence

b) facilities which may be quite widely used but which need some monitoring or traceability, such as special-event callsigns or unattended operation. These need rapid processing and could be handled by the RSGB issuing a small range of standard letters within suitable guidelines

c) facilities which need more detailed vetting and which would be handled by the DTI

Obviously the Society would be keen to do what it can to expedite the issue of these facilities, in the same way as we currently do for special-event stations.

So there you are - a mega-licence for the 21st century. We'll obviously keep you posted as to how we do in discussions with the DTI but those are the things we'll be asking for. Our proposals are very comprehensive, and the actual submission to the DTI took up about 30 pages. Much as we might wish it to be otherwise, the DTI does have a few other minor things to think about besides amateur radio, so our shiny new licence won't necessarily be its top priority. Judging by the rate of progress with things like packet radio, CEPT licences and whatnot in the past 18 months, we suspect it might take a few years

# Helplines

## FT102 USER GROUP:

Sean Quinn, GI4PCQ, is in the process of forming a user group for FT102 owners, with a view to the provision of an information exchange for fault tracing, maintenance hints, etc. There'll also be a newsletter and a regular net. Interested FT102 owners are invited to write to Sean at 58 William Alexander Park, Belfast BT10 0LX

## GM5SC - WHO, WHERE & WHEN?:

Anyone know anything about the callsign GM5SC, last listed in the 1954 Callbook? Info to GM4LFA, QTHR

## TOP-BAND FOX HUNTING:

Dave Cossar, GM3WIL is attempting to get a top-band fox hunting event organised for Scotland. Dave can offer advice on suitable equipment and how to get started. If you are interested in taking part or running a top-band fox hunt in Scotland, please contact:-

Dave Cossar, GM3WIL  
52 Bentfield Drive  
Prestwick  
Ayrshire  
KA9 1TT  
or tel: 0292-79217

## SCOTTISH CONVENTION - SARCON '87:

This year the Scottish National Amateur Radio Convention will be held in Europe's largest leisure centre, the Magnum Leisure Centre in Irvine, Ayrshire. The organisers have also broken the tradition of holding the convention on a Saturday in favour of Sunday 13 September to cater for those who have to work a 6-day week. Another addition will be a bring & buy sale and items over a specific value will go on to a separate stand in the main hall where they can be viewed properly and safely.

(cont from col 2)

for the dust to settle and for the new licence to become a reality. However, we must add that just before we went to press the DTI expressed a hope that the licence review could be completed in a matter of months. We're keeping our fingers crossed - watch this space.

# MORSE TESTS

The following list shows the dates and locations of all the available test centres from mid October to early December, as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
Co.Antrim	Belfast	10/10/87
Cumbria	Penrith	10/10/87
Fife	Glenrothes & DARC	13/10/87
Avon	Redland, Bristol	14/10/87
Suffolk	Ipswich	15/10/87
Worhamptonshire	Tiffelfield, Worthampton	15/10/87
West Glamorgan	Port Talbot	16/10/87
Wottinghamshire	Mapperley	17/10/87
Hampshire	Winchester	17/10/87
Cornwall	Liskeard	17/10/87
West Sussex	Morsham	18/10/87
Strathclyde	Glasgow	19/10/87
Lincolnshire	Lincoln	21/10/87
Leicestershire	Leicester AR Show	23/10/87
Leicestershire	Leicester AR Show	24/10/87
Greater London	Croydon	26/10/87
Devon	Plymouth	27/10/87
Greater London	Wood Green, W22	28/10/87
Grampian	Aberdeen ARS	29/10/87
Kent	Dover	04/11/87
Mid Glamorgan	Rhydyfelin	08/11/87
West Yorkshire	Pontefract & DARS	08/11/87
Central	Stirling	10/11/87
Worth Yorkshire	York	14/11/87
Isle of Wight	Binstead ARS, Ryde	14/11/87
Mid Glamorgan	Bridgend Rally	15/11/87
Shropshire	Telford	16/11/87
Strathclyde	Glasgow	16/11/87
South Glamorgan	Penarth	17/11/87
Isle of Man	Onchan, Douglas	17/11/87
Merseyside	Huyton, Liverpool	17/11/87
South Yorkshire	Stocksbridge	19/11/87
Bedfordshire	Luton	19/11/87
Dorset	Dorchester	21/11/87
Worfolk	Worwich	21/11/87
Lincolnshire	Grantham	21/11/87
Mertfordshire	Worth Watford	27/11/87
West Glamorgan	Port Talbot	27/11/87
West Midlands	Coventry	28/11/87
Lancashire	Fleetwood	28/11/87
Buckinghamshire	Bletchley, Milton Keynes	29/11/87
Greater London	Croydon	30/11/87
Cleveland	Billingham	02/12/87
Guernsey	St.Martins	03/12/87
Dyfed	Maverfordwest	03/12/87

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests.

## TRADE NEWS:



KEY OF THE DOOR:

Marco Trading, of Wem in Shropshire, have recently purchased 'Waltons' of Wolverhampton, a retail outlet which has been owned by the Dennes family since 1947. Marco Trading, established in 1972, made this acquisition to further its retailing operation. Although there is a retail outlet in Wem, Marco is best known for its mail-order business and catalogue which contains over 100 pages covering some 6,000 product lines. The photograph shows the 'key handover' being witnessed by Mr Budgen, Tory MP for Wolverhampton on the left with Martin Cox, Marco Director in the centre and Mr Jack Dennes, retiring proprietor on the right.

## SMC/AE - ANATOMY OF A MERGER:

A merger between two well-known emporia (incidentally, why do we call our local friendly wireless shop an "emporium"?) took place on 1 July 1987. Messrs Amateur Electronics and South Midlands Communications are now as one. The merged group will trade under the title of "South Midlands Communications Ltd" and the shop at Alum Road in Birmingham will trade under the name "SMC Birmingham".

SMC is now the sole UK distributor for the Yaesu range of products.

## CHANGE OF ADDRESS:

Because of continuing expansion of its product range, C.M.Howe Communications has moved to larger premises. The new address for all correspondence is:-

C.M.Howe Communications  
Eydun  
Daventry  
Northants NN11 6PT  
tel: 0327-60178



# Calling All Clubs

As we mentioned in last month's Bulletin (see the story "More help at local level" on page 587), the Society has recently been considering how to update the present representation scheme to meet modern-day requirements. As a result, we are now advertising vacancies for 60 new locally based volunteer Officers. If you would like to offer the Society your services, we are looking for keen and active people to take up the new post of RSGB Liaison Officer for each County, area and Island. This is a most worthwhile job for those members with sufficient free time who want to help to promote amateur radio and help their fellow amateurs get the best out of the hobby.

## THE BACKGROUND TO THE CHANGES:

Any organisation needs to make changes to keep up with the times. Last year we had a pretty substantial internal restructuring at RSGB Headquarters, and this year the Society has been considering the changes which need to be made to improve the effectiveness of its communications and the service it provides at a local level.

We've always been keen to dispel the myth that the "upper echelons" of the RSGB (whatever that might mean - it's a phrase which cropped up in a letter to HQ recently) live in an ivory tower remote from ordinary everyday amateur radio. There seems to be a feeling that - as the repeater users might put it - you can't "access" this mythical assemblage if you're a grass-roots member.

Fair enough - with about 35,000 members scattered all over the UK, it's obviously impossible for every single one of them to be on familiar terms with every Council and committee member and the staff at Headquarters. It's obvious that more local links are needed so that members can feel that they have some close contact with the Society and have easy access to it. Hence the "representation" schemes. The present regional representation system - which itself took over from the old "Town Reps" scheme - was designed to provide a link

This month we take  
an in-depth look at how  
we're updating our  
grassroots  
representation

between individual members, clubs and groups and the Society's central administration - as represented by Council, committee members and Headquarters.

The list of duties of Regional Representatives and Area Representatives is published in the Society's Green Book - this tome contains all the working "bylaws" describing the Society's volunteer operations. Basically the job of the AR and RR could be described as "running the Society's local office". Potentially they're the most important and influential link in the RSGB organisation. However, there are a few things which Council has had to think about in recent years. The representation scheme has now been in existence for over 30 years - and during that time both the Society's membership and the number of affiliated clubs and groups have quadrupled. Consider the poor RR in one particular region, in which there are no less than 70 (yes, seventy) affiliated clubs. This makes a target of even one visit to each club per year impossible to reach.

Another important change which has taken place over the years is that, whereas originally most of the Society's activities were at a national level - and a good many of them still are, of course - we also nowadays provide a considerable number of services to individual members. Under the present system your local friendly Regional Rep hasn't been provided with anything like enough information to be able

to pass on advice about these services. In the meantime, Headquarters currently needs no less than SIX full-time staff doing pretty well nothing else but dealing with members' queries - compared with a grand and impressive total of none a mere ten years ago. This has got to be a sure sign that the local operation and "self-help" bit of amateur radio isn't working efficiently. Taking on HQ staff is an expensive way to deal with fairly straightforward members' questions like how do I wire up my microphone, where's my local repeater and how much does the Call Book cost? Let's face it - we're supposed to be good at communication, so why aren't local amateurs helping one another to explore the potential of the hobby? In other words, there's a Hidden Asset somewhere which is very much under-utilised.

A Council Working Group and the Membership and Representation Committee have been preparing proposals to update the organisation so that it meets the needs of our members and maximises the effectiveness of the Society's local operations. Within these proposals are the opinions and suggestions of present and past RRs, which were of great help in confirming that the Society's organisation at local level is in need of review and that the changes we're about to make were long overdue.

## HOW THE NEW ORGANISATION WILL WORK:

The principles of the scheme have now been approved by Council. Its aims are:

1. To bring about closer co-operation and liaison between Zonal council members and local representatives, together with the committees and the Society's Membership Services Department.
2. To give representatives a clearly defined job, and to give them more HQ and committee support so that they will be able to work more effectively.

3. To equip the representatives with more information to enable them to keep members better informed about the work of the Society, to deal with or direct members' questions to the appropriate local specialist (like the EMC expert or the chap who knows all about planning matters) and to feed back members' views to the Society.

4. To make the representatives more accessible, to provide a more useful service to members and to the Society's HQ and committees involved in local activities.

5. To encourage clubs, as the main organisations locally, to take an active part in the scheme.

To achieve these aims the following changes will be made:

1. The current Membership & Representation Committee will be replaced by the Membership Liaison Committee. Under its new terms of reference the MLC will run the new organisation. As of 1 January 1988, the new RSGB Liaison Officers for designated Counties, Areas or Islands, (for example, RLO Dorset) will replace existing Regional and Area Representatives. The definition of the role of the RSGB Liaison Officer is to:-

- a) ensure the smooth running of local activities which are co-ordinated by the Society.
- b) promote the growth of amateur radio and the Society's activities at local level.
- c) provide a link between the membership and central organisation.
- d) provide a focal point of contact for the Society locally.

2. In order that this new job can be done well, the "service area" needs to be small enough for the officer to be known and accessible to all members - or at least clubs - so that they will seek the advice of the RLO in the first instance when they have a problem which can best be dealt with at local level.

A Deputy may also be appointed to assist if the area or workload warrants this.

The old division of the country into 20 regions meant that reps had far too large an area to cover and too many members and clubs with which to cope. Under the new scheme the Country has been divided into 60 areas of a more manageable size and we've listed these below. If it turns out that we need to subdivide some, we'll do so later.

One of the new duties of the RLO will be to act as a focal point for local queries about the Society's services. The idea would be not necessarily to solve problems on the spot but to direct members to the right quarter where their problems may be solved at local level.

3. With the intention of off-loading problems directed to Headquarters which could be better dealt with at local level, we'll be getting data on the various aspects of the Society's operation together - with detailed information on services and general matters. We'll put this in the form of a handbook, which will be given to the RLOs to assist them in their work. The handbook will be in a form that will allow it to be updated periodically.

4. Headquarters and committees seeking to fill vacancies for various specialist posts "in the field" will be able to seek advice from the RLO, and one of his functions will be to make local amateurs aware of the need to fill vacant posts in local services. We very much hope that clubs will play a major role in this area.

5. Following on from (4), clubs are the only viable organisations which can provide the resources and effort to train, educate and encourage newcomers, provide practical advice and promote amateur radio in a friendly environment at local level. In this they're complementary to the activities of the national society (i.e. RSGB) and we look to them to play a part in the major reorganisation of the representation system. To a large extent, the success of the scheme depends on the person representing the Society being well known locally and also being an integral part of the local club scene.

The next edition of the Green Book will include the RLO's terms of reference. For those wishing to become an RLO (and those wishing to nominate a candidate for the post), a job description is printed below.

## NOMINATION PROCEDURE:

The old system of electing Regional Reps was a bit unsatisfactory on several counts. The first was simply that it didn't produce many candidates! We suspect this was because the job wasn't very clearly defined and because the job was too big for an individual to cope with. The second problem was that it also didn't produce much in the way of votes from the membership, either because comparatively few members knew the candidates or they were apathetic about the system. Yet another snag was the potential high cost of administering elections. So - taking one shining example - it was possible for a nominee to stand unopposed and thus be elected by five members to represent a region of 2,500 or more members. So we thought we'd make a major modification. As we've said, we hope that under the new scheme clubs will feel like becoming much more involved in the Society's local operations. We firmly believe that clubs are certain to know who are the really good and effective "do-ers" in their local area - so we're giving them the responsibility of nominating the right people for the RSGB Liaison Officer's post. This is how it'll work. All affiliated societies and registered RSGB groups of ten members or more are invited to nominate one candidate of their choice for the post of RLO in their County, Area or Island. Obviously the candidate must be an RSGB member. The closing date for nominations is Friday, 16th October 1987. RSGB members wishing to be nominated for the new post should advise clubs or groups in the relevant area of their willingness to stand.

In the event of more than one person asking an affiliated society to nominate them as RLO for the area, the club/group concerned is expected to make a fair selection of the candidate to be nominated by whatever means it feels appropriate within its constitution. In the event of there being more than one nomination received for a post in an area, an election will be held whereby each affiliated society in the area is given two votes to

(Talking Point continued)

indicate their first and second choice. The candidate with the largest number of votes will be chosen to be nominated for that area. The vote MUST reflect the wishes of the RSGB members in the club - these wishes are to be determined in a manner consistent with the club's constitution. Clubs/groups may choose to extend an invitation to local amateurs who are RSGB members to attend a meeting to present their views.

In the event of the vote resulting in a tie, a second election involving only those candidates that tied will be held among the clubs. If a tie still results the Membership Liaison Committee will break the tie with a casting vote following discussions with the clubs involved.

The Zonal Council member will administer elections for all areas in his Zone.

The Membership Liaison Committee will recommend each successful candidate for appointment by Council on 28 November 1987. Appointments, which will normally run for 3 years commencing 1 January 1988, may be subject to review at any time during that period. The list of appointments will be announced at the Society's AGM on 5 December 1987 and published in the January 1988 edition of RadCom.

#### JOB DESCRIPTION OF THE RSGB RLO:

##### 1. CLUBS ACTIVITY

1.1) To maintain contact with each club, and to visit each club several times each year as appropriate

1.2) To encourage activities in clubs which foster and promote amateur radio in their area, in particular:-

- a) Activities of interest to newcomers, especially the young.
- b) RAE and morse classes
- c) Providing advice and assistance to amateurs in their area

##### 2. REPORTING ACTIVITY

2.1) To provide summaries of club activities and the effectiveness of the Society's activities at local level, via the Zonal Council member, prior to each meeting of the Membership Liaison Committee.

2.2) To feed views from members back to the MLC via the Zonal Council member.

2.3) To encourage clubs and individuals to input news to the WQ news and information department.

2.4) To become familiar with the operation of the Society and arrangements for its activities at local level, so as to be able to direct members' questions to the correct person. These include:-

GB2RS and news  
EMC advice  
Planning advice  
Slow morse transmissions  
Raynet  
Training  
QSL bureau  
Repeaters  
Beacons  
Morse testing  
Clubs  
RAE/Morse training  
The Society's Committees  
Membership Services

##### 3. PUBLIC RELATIONS

3.1 Will encourage public relations activities by:-

- a) Explaining how the RSGB and clubs can promote amateur radio
- b) Encouraging specialists to give talks
- c) Co-ordinating dealings with the local media
- d) Ensuring that clubs have copies of relevant RSGB literature

##### 4. EXPENSES

RSGB Liaison Officers may claim reasonable out of pocket expenses. However, before committing themselves to any significant expenditure they should seek agreement through their Zonal Council members.

Nominations using the format printed below for the post of RSGB Liaison Officer for each County, Area or Island listed should be sent to;

The Secretary  
(MLO nomination)  
RSGB  
Lambda House  
Cranborne Road  
Potters Bar  
Werts EN6 3JW

Nominations are invited for the areas listed below. They must arrive at HQ by Friday, 16th October, 1987.

#### ENGLAND

1. Cornwall/Scillies
2. Devon
3. Somerset
4. Dorset
5. Avon
6. Guernsey
7. Jersey
8. Wiltshire
9. Isle of Wight
10. Wilts
11. Gloucs
12. Oxon/Berkshire
13. West Sussex
14. East Sussex
15. Surrey
16. Kent
17. Worth London
18. South London
19. Bucks
20. Herts
21. Essex
22. Leics
23. Hereford & Worcester
24. Norfolk/Suffolk
25. Beds/Cambs
26. Warrants/Waricks
27. Derby/Notts
28. Staffs/Shrops
29. Warrants/Lincolnshire
30. Cheshire
31. W.Midlands
32. Merseyside
33. Gtr Manchester
34. S.Yorks
35. W.Yorks
36. W.Yorks (W.E. of R.ouse)
37. W.Yorks (S.W. of R.ouse)
38. Lancs
39. Isle of Man
40. Cumbria
41. Durham/Cleveland
42. Tyne & Wear/  
Warrants

#### WALES

43. Gwent
44. Mid.Glam/S.Glam
45. W.Glam/Dyfed
46. Powys/Gwynedd/Clwyd

#### SCOTLAND

47. Dumfries & Galloway
48. Central
49. Strathclyde
50. Borders
51. Lothian
52. Grampian
53. Fife/Tayside
54. Highlands/W.Isles  
(plus a deputy)
55. Shetland
56. Orkney

#### NORTHERN IRELAND

57. County Down,  
County Armagh and  
County Fermanagh
58. County Antrim,  
 Londonderry and  
 County Tyrone
59. Belfast



# 2nd AMSAT~UK

No less than fifteen hours of lectures in one weekend gave those who attended the second AMSAT-UK Colloquium plenty to think about. All of the lectures were very well attended and everyone learned a little more about the amateur satellite service, the UoSAT projects and the development of packet radio and digital communications.

Dr Arthur Gee, G2UK, Chairman of AMSAT-UK, opened the proceedings by touching on the history of amateur satellite communication, and at the same time announced that his new book "Amateur Satellites - The First 25 Years" had just been published. (The book is available from AMSAT-UK and RSGB, hint hint)

The Colloquium attracted many of the world's leading lights in the satellite field, including Karl Meintzer, DJ4ZC of AMSAT-DL, Graham Ratcliffe, VK5AGR of AMSAT-VK OSCAR 10 Command, Ian Ashley, ZL1AOX of the AMSAT-OSCAR 10 Command in New Zealand, and Vern Riportella, WA2LQQ, President of AMSAT-NA (North America) - in place of Jan King, W3GEY who was unable to attend due to pressure of work - and representatives of AMSAT Groups from Sweden, Finland, the Netherlands, Germany, France, Italy, the Gabon, South Africa, Brazil and USA. Also, from the University of Surrey, Dr Martin Sweeting, G3YJO, Director of UoSAT; Jeff Ward, G0/K8KA, UoSAT-DCE Project Leader; Craig Underwood, G1WTW, UoSAT Satellites in Education Project Leader, and Jacky Rathbone, G1WJN, UoSAT-CCD Project Leader.

Leonid Labutin, UA3CR, was scheduled to give a talk on the state of the Russian Radio Sport (RS) satellites, but at the last minute he sent a message via packet radio saying that he was unable to attend. In the end some 18 countries were represented and Mrs Joan Heathershaw, G4CHH, President of the RSGB, welcomed the overseas delegates during her opening address on the Saturday morning.

The lectures covered the work being done by the UoSAT Group, AMSAT-DL and AMSAT-NA as well as an overview of the amateur satellite programme and an introduction to packet radio. One of the most entertaining lectures was given by Geoff Perry of the Kettering Group. Geoff, who is not licensed, gave an



The RSGB's President Mrs Joan Heathershaw, G4CHH, welcomed the 180+ delegates from the UK and overseas during her opening address at this year's AMSAT-UK Colloquium.

account of his work at Kettering School where he tracked and identified many of the Russian satellites using nothing more than basic amateur techniques, a lot of common sense and no computers or sophisticated state-of-the-art technology.

During the closing forum, Karl Meintzer and Vern Riportella spoke of the need to make amateur satellite communication more accessible to all amateurs and both defended their approach to this problem through the planned AMSAT Phase 3-D and Phase 4 projects.

In a very graphic illustration, Karl pointed out that the average age of radio amateurs had risen by one year each year for the last twenty years and if this trend continues, by the year 2000 there would be no radio amateurs left to enjoy any of the exciting technical projects being discussed. This is a subject very close to the Society's heart and during its 75th anniversary year, much work will be done to encourage new and younger blood into our unique hobby.

One of the main features that made the Colloquium such a success was the social aspect of the event. Over 180 like-minded amateurs and scientists were there to swap ideas

and compare notes about the future of amateur radio, how to attract young blood into the hobby and to look at the development of new and improved satellite communication techniques. It was refreshing to see small groups of people, the learned and the learning, exchanging quite radical views on a whole range of topics. New friendships were made and old acquaintances renewed.

The whole event was organised by Ron Broadbent, G3AAJ and during the RSGB President's Opening Address, it was announced that the Calcutta Key - presented by the RSGB in recognition of outstanding work in promoting international friendship through amateur radio - would, this year, go to Ron for his dedicated work as Secretary of AMSAT-UK over the last decade. The official presentation will be made at the Society's Annual General Meeting in December.

Next year's AMSAT-UK Colloquium will take place at the same venue - the University of Surrey - on the last weekend in July.

A report of the technical aspects of the event will be given by Bob Phillips, G4IQQ in his 'Satellites' column, next month.

# COLLOQUIUM

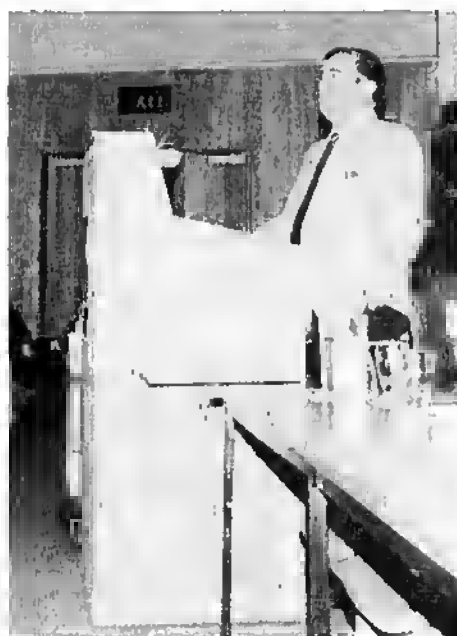


Mrs Joan Heathershaw, G4CHH, with the delegates from 18 overseas countries who took part in the Colloquium. Each overseas delegate was presented with an RSGB pennant as a memento of their visit.



Ron Broadbent, G3AAJ

Ron is Hon Sec/Treasurer of AMSAT UK and editor of OSCAR News.



Vern "Rip" Riportella, WA2LQQ

Vern is the President of AMSAT-NA and editor of the AMSAT Satellite Report (North American equivalent to OSCAR News). He lives in New York state and is currently engaged in the negotiations and planning for another OSCAR to be built by AMSAT, in the Phase 4 series.



Karl Meintzer, DJ4ZC

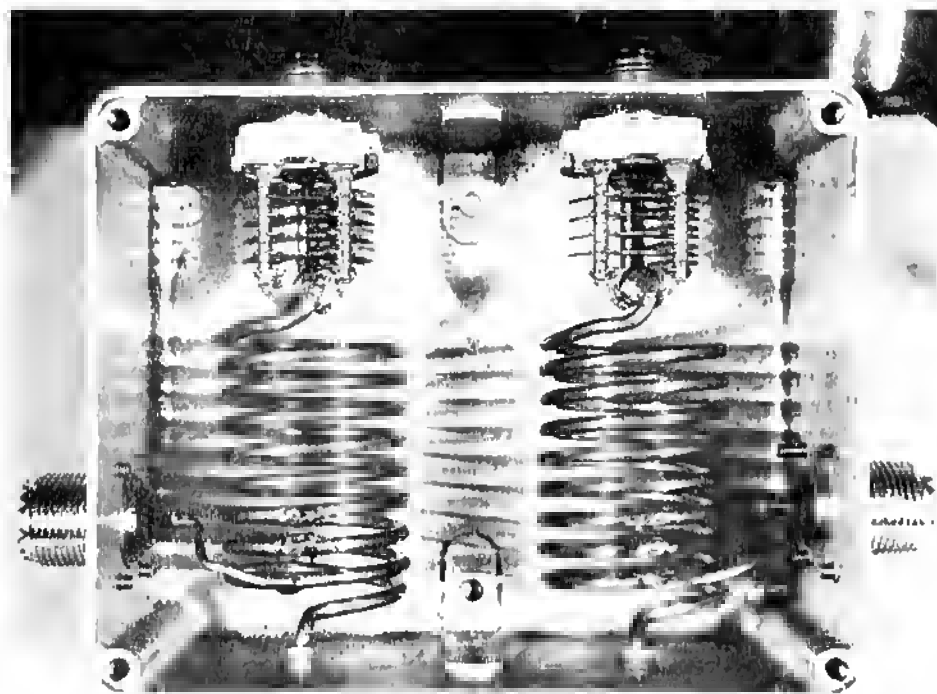
Karl is the President of AMSAT-DL and designer of the many Phase 2 and current phase 3 satellites. He is a Doctor of Physics at Marburg University and is currently involved in the design and negotiations for another OSCAR to be built by AMSAT-DL, phase 3-D.



Geoff Perry

Geoff was the leading light of the Kettering School Satellite Group, which is celebrated for giving the world the first news of many Russian rocket launches. His down-to-earth practical experience and superb lecturing ability make him unique at space gatherings.

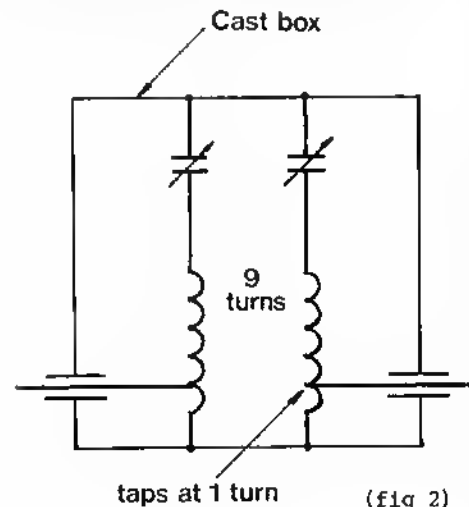
## Keeping your 6m clean - part 2



(fig 1)

### DUAL TUNED-CIRCUIT FILTER:

The second 50 MHz filtering device (see last month's edition for the first) is slightly more technical. It consists of two closely-coupled tuned circuits, with the input and output tapped on to the bottom of the coils. With this arrangement an accurate match to the transmitter and antenna feeder can be made. As you can see from the pic, the taps should be made at about one turn from the bottom of each coil - both coils have an internal diameter of 1". The filter, incidentally, has an insertion loss of less than 0.5 dB and provides about 50 dB attenuation of the dreaded second harmonic.



(fig 2)

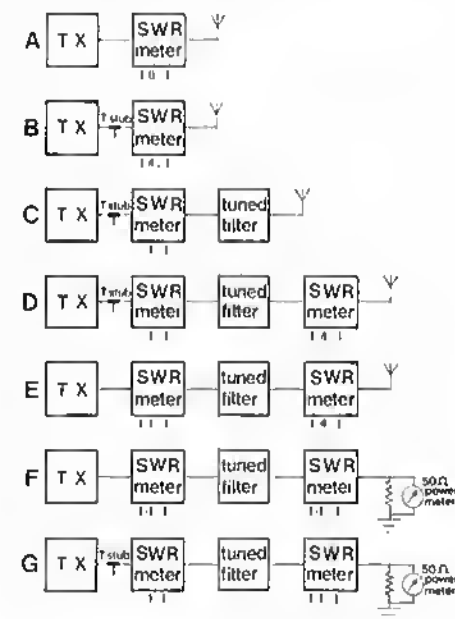
In the spirit of one picture being worth a thousand words, it's probably best to take a look at Fig.1 to see how to build the filter - Fig.2 shows the circuit diagram. The original "Eddy box" used by G6JP was a standard type 6908P but anything similar should be suitable. However, it's miles better to use an aluminium-alloy die-cast box for this project than to mess about bending one up from aluminium sheet or fiddling with sheet and angle stock. The tuning capacitors are standard C804 15pF types from Jacksons (more or less anything would do as long as the value is OK and they'll physically fit in the box) with 5 fixed and 5 moving vanes. You need to bend over one fixed (stator) plate on each capacitor at right angles to form the lug which the inductor is soldered to, and you'll also need to remove the associated moving (rotor) vane - the pic shows this detail clearly.

To fix the earthy end of each inductor to the box, two methods are possible - well, several methods are possible but we recommend one of the following two. If you have the appropriate taps and dies you can cut a thread on the earthy end of the inductor and drill and tap a suitable hole in the die-cast box. Two nuts on the wire thread either side of the box wall with shakeproof washers and a

dab of Loctite will make a solid and lasting job. The other good way is to counterbore the head of an OBA screw to fit the wire size used, solder the wire in with a large iron (don't try using your little 15W safe-on-CMOS "PCB Special" for this job - you'll need to resurrect the trusty old kettle-mender from its last resting-place in the garden shed or use a solder gun) and then to attach the threaded end with a nut. Either way is considerably better than trying to do it with solder tags, which isn't fun with 12 swg wire and probably won't make a reliable job.

When you've completed the device, all you need to do is to connect the transmitter to the filter input via an SWR bridge and the output of the filter to a dummy load - via another SWR bridge if you have access to one but directly if you haven't. Adjust the input capacitor for lowest SWR and then transfer the SWR bridge to the output side of the filter (ignore this if you have a second SWR meter). Tune the output capacitor for lowest SWR. Repeat until you're happy that the SWR on both sides of the filter is as low as possible. That's it!

George Jessop has provided an analysis of the results of the various tests shown in the block diagram - Fig.3 - as follows;



(fig 3)

Diagram A - shows an SWR of 1.6:1 with the Tx connected directly to the antenna.

Diagram B - adding the stub gets rid of a good deal of the spurious outputs from the Tx and the SWR comes down to 1.4:1.



Diagram C - now the tuned-circuit filter is added to the set-up in B. An SWR of 1:1 between transmitter and filter is achieved.

Diagram D - matching the filter into the antenna.

Diagram E - removing the stub increases the SWR seen by the transmitter to 1.1:1.

Diagrams F and G - show the results obtained when the recommended arrangement is fed into a 50 ohm dummy load/power meter with and without the stub.

There's another advantage in using a double-tuned band-pass filter of this type, which was brought to our notice by G3DVB. He built a similar filter for 50 MHz, although since his capacitors were physically larger he reduced the size of the coils by one turn to fit them in. Both capacitors, which had a maximum value of 12 pF, were half-meshed at resonance. The coils were wound on a 1" diameter former with 14 swg wire and earthed to the box as per our option (2) above.

Using the Potters Bar beacon GB3NHQ as a signal source, there was no measurable loss. On transmit, however, the results were surprising. G3DVB fed the output of a two-tone source into the microphone socket of an FT690R and measured the output into a 50 ohm dummy load with a Bird 43 wattmeter (i.e. a high-grade professional power meter). Without the filter in circuit the measured output was 1.9 watts. However, inserting it in circuit and tuning up produced an increase in power to 3.2 watts! (Good filters, these RSGB designs - who needs linears?). Interestingly enough, the filter needed to be retuned when the rig was switched to the low-power FM position. G3DVB considers that all these things tend to suggest that the output matching circuitry of the FT690 might not be all it should be and that the filter was also acting as an antenna matching unit.

So - go to it and build one or preferably both of these for your 50 MHz rig. Should stop your hi-fi enthusiast neighbour hanging on your front door during the Proms season ("Land of Hope and Promise" - or even worse a large gentleman from the radio department of the fire brigade, which also operates around 100 MHz in many parts of the UK. "You - er - wouldn't like your radio shack to catch fire, now, would you, sir?". Keep your 50 MHz rig clean and watch that ERP and we should all be able to sleep better at night.

#### HF EXPEDITIONS FUND:

The RSGB's HF Committee has launched a new fund designed to assist intending HF DX-peditioners both in the UK and world-wide. Its objectives include the following:-

- \* To acquire suitable light-weight, easily transportable, equipment for loan to DX-peditioners.
- \* To assist with the costs of chartered transportation, eg. boats to uninhabited islands.
- \* To help with the cost of good quality pictorial QSL cards.

When making recommendations on payment the HF Committee will take into account, amongst other factors, the likely interest of Society members in the proposed expedition, the degree of participation of Society members, the relevance of the expedition to Society awards, the range of activities proposed, and the quality of leadership.

For the next few years, the priority will be to build the Fund's finances and payments will be infrequent. Progress will be reported annually in Radio Communication. In the meantime, donations and requests will be very welcome.

Full details of the Fund's terms of reference are available from Martin Atherton, G3ZAY, PO Box 146, Cambridge.

#### RSGB STRAIGHT KEY DAY:

The RSGB's Straight Key Day, organised by the HF Committee, takes place on Saturday 10 October from 0800 to 2100 GMT between the frequencies 3515 and 3555 kHz.

The HF Committee is keen to support the active use of CW on our hands and to encourage the use of CW by newcomers to HF operation. We hope that both new huggs (geddit?) and old timers will participate.

To allow full coverage of the UK during daytime and early evening, the 80m band has been chosen. Participants are asked not to stray into the DX portion of the band, nor into the QRP area around 3560 kHz, though we hope that QRP operators will take part in the event.

No awards are planned but the HF Committee would welcome any comments from operators, particularly on the best "fists" heard during the event. Comments should be sent to Colin Turner, G3VTT (QTHR).

We suggest that the normal QSO information be expanded to include details of the key being used, its age and any interesting history attached to it. Photographs of the keys used would also be welcome for possible inclusion in any future account of the event.

We do hope there will be a high level of support for both this event and any subsequent ones that we arrange.

#### WELSH AMATEUR RADIO CONVENTION

Oakdale Community College, Blackwood, Gwent

SUNDAY 4 OCTOBER

10am - 5pm

\* Trade exhibits \* Convention station \* RSGB stand \* Bring & buy \*  
\* Refreshments \*

Official opening at 11am by Mrs J Heathershaw, G4CHH, RSGB President

#### LECTURE PROGRAMME

HF & VHF features

Admission: £1.50, at the door

(includes Prize Draw - £300 in cash prizes)

Talk-in from 9am on S22

Exit 28 off M4 Motorway

Further information from:- Mr B Davies, GW3KYA  
16 Vancouver Drive  
Penmain  
Blackwood  
Gwent NP23 0UQ  
tel: 0495-225825

# Around the Groups

## RAOTA NEWS:

John, G2PT, informs us that the annual QSO reunions between members of RAOTA (the Radio Amateur Old Timers' Association) and the Dutch OTC (Old Timers' Club) take place on Monday 5 and Tuesday 6 October from 0830 GMT to about lunchtime each day. Initial calls should be made on 3600 kHz SSB and 3550 kHz CW. If conditions on 40 metres are favourable, calls may also be made on 7070 kHz and 7025 kHz respectively.

RAOTA also holds weekly nets under the callsign G2OT. These take place on Wednesday and Thursday mornings on 3765 kHz starting at 11am and on Thursday evenings on 3535 kHz starting at 7pm. Members and non-members of RAOTA are welcome to join the nets.

Membership of RAOTA is open to all licensed amateurs and short wave listeners who have been interested in amateur radio for more than 25 years. Details can be obtained from Sylvia Havard, G4USN (QTHR).

## WAB NEWS:

Not a lot from WAB this month because of holidays, but they would like to say thank you to all those involved in the recent Welsh Islands Expedition. The expedition activated two islands, Skokholm and Grassholm, and three squares, SM70, SM50 & SM60. These island count towards the Islands on the Air Award which is available for working 25 islands on HF or 10 islands on VHF (Basic Award).

On the 6th or 12th of September (not confirmed at press date) G1IUY and G4TGK intend to operate from WAB Square TQ91 Kent on both 80m and 2m. This is a fairly rare square that has not been activated for some time.

The 8000 series of WAB Record Books is now out and as of the 3rd of August, No.8025 had been issued. WAB membership, which includes the record book and full details of the awards scheme, is available from Brian Morris, G4KSQ at a cost of £6.00 (incl p&p).

## RADIO FRATERNITY LODGE:

Mr Joe Hill, G3JIP, was recently installed as Worshipful Master of the Radio Fraternity Lodge of Freemasons for 1987-88. The Secretary of the lodge is Mr Maurice A Pyle, G2BLA and any queries may be sent to him QTHR.

## BYLARA SWOPS CHAIRS:

The new Chairperson of BYLARA - The British Young Ladies Amateur Radio Association - is Mrs Dawn Corallini, G4YOS. Mrs Corallini has taken over from Miss Angelika Voss, G0CCI.

## The BYLARA Awards Manager is:-

Mrs Joy Stirling, GMOGUU  
159 Methlick Brae  
Glenrothes  
Fife KY7 6UF

.... and all enquiries concerning BYLARA awards should be addressed to her. It is intended to offer an award for working Scottish BYLARA members and details will be given as soon as we have them.

In one of the entries in the current UK Callbook, the Secretary of BYLARA is given incorrectly as Mrs C Bell, G4KVR. It should read 'Alison Soars, G0ALI' and will be corrected in the next issue.

## RADIO ASTRONOMY LECTURE:

The Verulam ARC is holding a special lecture on radio astronomy on 22 September. The guest speaker will be Dr. P. Duffett-Smith, G3XJE of the Cavendish Laboratory, Cambridge University. The lecture will be held at the RAF Association HQ, New Kent Road, St.Albans starting at 7.30pm. All visitors will be welcome and there will be a raffle and the usual bar facilities.

Further details from Hilary, G4JKS on St.Albans 59318.

## MARY QUEEN OF SCOTS:

The second commemorative station GB2MQS, run by the Mid-Lanark ARS, will take place on 5/6 September from Stirling Castle. To qualify for the 'Mary Queen of Scots Certificate', you must have worked the first station (active 8 February) and work this one. Claimants should send both QSL cards or log extract (for UK station) and an A4 sized stamped addressed envelope (or 2 IRCs) to PO Box 20, Motherwell, Scotland.

## ROYAL WELSH NATIONAL EISTEDDFOD:

The Newport ARS will be running the special event callsign GB2EC in preparation of the Royal Welsh National Eisteddfod, to be held next year. Members of the NARS will

hold the callsign on a rota basis from October 1987 until the start of the Eisteddfod in July 1988, making a total of ten operating periods. The callsign will be active on HF and VHF during each period.

Awards can be claimed for working GB2EC whilst held by different operators and the NARS club callsign, GW4EZW will count for one contact. The requirements for the award are given below:

## HF:

UK - 8 contacts  
Europe - 5 contacts  
Outside Europe - 3 contacts

## VHF:

100km radius - 8 contacts  
250km radius - 5 contacts  
250+km radius - 3 contacts  
(radius of Newport)

Each QSO will have a serial number and this should be quoted when claiming the award. Full details can be obtained from the Newport ARS, PO Box 33, Newport, Gwent and please enclose a stamped addressed envelope or IRCs.

## ROARS - 15th ANNIVERSARY:

The Royal Omani Amateur Radio Society, which was formed under the gracious patronage of His Majesty Sultan Qaboos Bin Said, A4XAA, celebrates its 15th anniversary this year.

To mark the occasion, the Society will be running a 4-day non-stop special event station from 02 hours GMT on Thursday 5 November to 20 hours GMT on Sunday 8 November using the callsign A4XXV (A4X-15"). Operation will take place in the 160, 80, 40, 20, 15 and 10 metre bands using SSB, CW, RTTY and AMTOR.

An exclusively designed special award will be available for all operators or short wave listeners who work or hear A4XXV on two different bands or two different modes. All claims must be supported by a certified log extract and be accompanied by 10 IRCs or equivalent. The deadline for claims is 30 June 1988 and they should be sent to:-

The Awards Manager, ROARS  
PO Box 981  
Muscat  
Sultanate of Oman

(more)



#### THE GREAT ST JOHN PARTY:

GB4SJA (St. John Ambulance) took to the air as part of the St. John Ambulance 81rigade Centenary celebrations in Hyde Park, London on 20 June. As reported in the June issue of RadCom, the Grafton Radio Society was approached to set up a special event station and responded enthusiastically.

The station included two 60' towers, thanks to Strumech Versatower, with a 5-ele log periodic tri-band beam for HF and a pair of phased 19-ele beams on 2m. Two Drake transceivers were used on different HF bands and a Trio 711E on 2m.

Around 750 contacts were made, which was not an enormous amount since the emphasis was on involving the public and demonstrating the various aspects of amateur radio. There was even a computer receiving station for weather satellites which just about survived above all the RF noise! During the course of the day, many visitors from around the world called in at the tent



Selwyn, 9Y4SO, casts an expert eye over the Drake line-up whilst another St. John Ambulance member (getting ready to pass his greetings message) shares a joke with Rod, G1ACL, the Grafton RS Secretary.

including Selwyn, 9Y4SO, from Trinidad. As he is a Drake user himself, he spent some time in the HF tent where the two Drake stations were being operated.

The whole event was a great success and the Grafton RS members thoroughly enjoyed setting up and operating GB4SJA as their contribution to the Great St. John Party. (see photos)

#### NEW AWARDS MANAGER:

As reported in last month's "Council Brief", Peter Miles, G3KDB, has decided to stand down as the Society's Awards Manager after some years of sterling service. His replacement is;

Steve Emlyn-Jones, GW4BKG  
Lan Farm  
Blackmill  
BRIDGEND  
Mid-Glamorgan CF35 6EP

#### NEWS FROM ACROSS THE POND:

To commemorate the 60th anniversary of Terrance Bay, British Columbia, amateurs in Terrance Bay may use the special prefix X07 throughout December.

The 15th Winter Olympic will be held in Calgary, Alberta and to commemorate this event, Canadian amateurs may use the following special prefixes from 1 January to 29 February 1988: CH1 in the Yukon, CJ1 and CJ2 in Newfoundland and Labrador, and VX1 to VX8 in the remainder of Canada.

Final snippet - the ARRL has drafted a Petition for Rulemaking asking the US FCC to amend its rules so that amateurs visiting the USA would use a prefix identifying the region in which they are operating rather than a suffix, as recommended by IARU. It requires an amendment to the Canada-US Convention of 1952 but this apparently shouldn't be a problem as the Convention is currently under re-negotiation.

Applications from overseas should be sent to PO Box 20, Bridgend CF35.

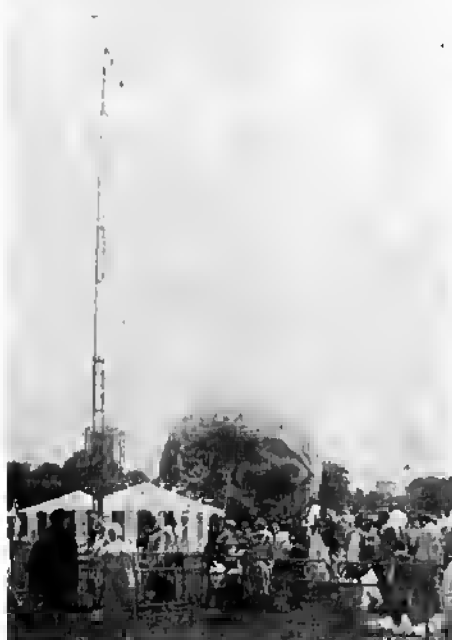
Peter Miles will continue to certify members' applications for overseas awards for the time being.

Note that the Islands-on-the-Air programme remains the responsibility of Roger, G3KMA.

#### ATTENTION - ALL RALLY ORGANISERS:

The RSGB will shortly be circulating the 1988 Events Diary to all clubs, Societies and Groups. In addition to this, the Society intends to produce a pocket diary for 1988 - our 75th Anniversary year.

If you have not yet registered your 1988 event date with RSGB HQ, please contact our News & Information Department now. We intend to include major events in the 1988 RSGB diary.



The site of GB4SJA showing the two 60' Versatowers and, in the middle, the world record-breaking 35' diameter inflatable globe (eat your heart out Richard Branson...)

# Events Diary

## Mobile Rallies

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact details and telephone numbers direct to HQ and marked 'Bulletin'.

### 6 SEPTEMBER

\*Proston ARS 20th Annual Rally - Lancaster University. Opens 11am (earlier for wheelchair disabled). \*RSCB stand\*, trade stands, large bring & buy, bar and restaurant. Talk-in on S22. Details G3DWQ, tel: 0772 53810.

\*Bristol Radio Rally - Hereclive Youth & Hereclive Community Centres, Hereclive Road, Hereclive, Bristol. Opens 10am, usual traders, bring & buy stall, bar & refreshments. Talk-in on S22 by G2BRR. Details Lan G4RZY, tel: 0272 634262.

\*West Kent Amateur Radio Rally - Angel Centre, Tenbridge, Kent. Opens 10.30am, usual traders, bring & buy stall, club stands, Stamp Fair. Talk-in by G8OKS on S22, S28 and 29.500 MHz FM. Details G4KIU, tel: 0892 515678.

### 12 SEPTEMBER

\*Ballymena Mobile Rally - Ballymena High School, Ballymena. Details G1AHCH.

### 13 SEPTEMBER

\*Lincoln Hamfest - Lincolnshire Showground, Lincoln. 4 miles north of Lincoln on A15 Lincoln to Scunthorpe road. Opens at 10.30am. All usual trade stands. \*RSCB Stand\*, bring & buy, refreshments both inside & outside of hall, real ale bar. Lots of attraction for the whole family including reffias, flypast by WW2 Spitfire, helicopter rides (happily), model cars & model aircraft displays. Coppers welcome. Talk-in on 2m & 70cm. Details G6VCF, tel: 0522 25760.

\*Scottish AR Convention - The Magnus Sports & Leisure Centre, Irvine, Ayrshire. Opens 10.30am. Usual traders. \*RSCB Stand\*. Many attractions for the whole family at the centre. Details Bob, G4DECU on 0563-35738.

\*National Amateur Radio Car Boot Sale - Did Warden Aerodrome, Biggleswade, Beds. Opens 10am, trade and private stands (over 250 last year), restaurant and cafe, the Shuttleworth Collection Aircraft and Motor Museum. Talk-in on S22 by G4SGC. Did Warden Aerodrome is well signposted from the A1. Details Wendy, tel: 0582 451057.

\*Telford Mobile Rally - Telford Racquet & Fitness Centre. Arrive via M54 (junc 5) or A442 from north or south. Opens 11am (10.30am for disabled visitors). Usual traders and attractions. Lecture by MAXPAC, G3R7P/G4FNC and G3SEK. Talk-in by G4IRG on S22 and S28. See advertisement in August issue. Details G3UKV on Telford SS416.

### 20 SEPTEMBER

\*Peterborough R & ES Rally - Wirrina Sports Stadium, Peterborough. Details G4PNK.

\*Trallier Rally & Components Fair - Lancs CCC (old Trallier), Talbot Road, Stretford, Manchester. Opens 10.30am (10am for disabled visitors on ground floor) talk-in on S22. Details G1JJK, tel: 061-748 9804.

\*Vange ARS Rally - Nicholas School, Leinster Road, Landon, Opens 10am. Talk-in by G4VNR. Details Alan G4DJN, tel: 02774-4386.

### 27 SEPTEMBER

\*Harlow Mobile Rally - Harlow Sports Centre. Details G4KVR, tel: 0279 22365, daytime or G3UEG, tel: 0279 27788, evenings.

\*RSCB HF CONVENTION - Belfry Hotel, nr Oxford. Opens 10am, comprehensive lecture programme, awards presentations, competitions, stands by special interest groups, refreshments & bar. Special 848 and Weekend rates available from the Belfry Hotel. FCC Examinations will take place at the hotel on Saturday 26 September.

### 4 OCTOBER

\*Welsh Amateur Radio Convention - Dardale Community Centre, Blackwood, Gwent. Details Brian G4XVA, tel: 0495 225823.

\*Woking Mobile Rally - Details G4RCH, tel: 0532 536633.

\*Groat Lumley AR & ES Rally - The Community Centre, Groat Lumley, Chester-le-Street, County Durham. Opens 11am, talk-in on S22. Details G4MSF, tel: 091 469 3955.

### 10 OCTOBER

\*RSCB MIDLANDS VHF CONVENTION - Madaley Court Centre, Telford, Shropshire. Details Peter G3UBX.

### 11 OCTOBER

\*Armagh & Dungannon District ARC Mobile Rally - Drumshill House Hotel, 2 miles from Armagh on Hey Road. Details G4DDO.

### 18 OCTOBER

\*"ELODEX" (Electronic Hobbies Exhibition run by

Hornsea ARC) - Floral Hall, Hornsey. Opens at 11am (early entry for disabled visitors). All the usual traders, bring & buy stall, demonstrations by other local clubs. Refreshment and bar facilities. Good car parking. Located on the sea front so ideal for all the family. Potteries and Mero close by. Talk-in on S22 by G4EKT. Details Duncan, G3TLI on 04012-2588.

### 23/24 OCTOBER

\*Leicester Amateur Radio Exhibition - Granby Halls, Leicester. \*RSCB stand\*, all the usual traders, large bring & buy stall, bar and refreshment facilities. Located close to Leicester BR station and city centre, large car park near by. Details Frank G4PDZ, tel: 0533 553293.

### 1 NOVEMBER

\*Carmarthen ARS Exhibition & Rally - Leisure Centre, Johnstown, Carmarthen. Opens at 10.30am, trade stands, flea market, cafe & bar, swimming pool. Talk-in on S22 Details G4GUE, tel: 026 783 460.

### 7 NOVEMBER

\*7th North Devon Radio Rally - Bradworthy Memorial Hall, near Holford. Opens at 10.30am, usual traders, bring & buy. Talk-in on S22. Details G4MXI (OTHER).

### 2/8 NOVEMBER

\*North Wales Radio Rally - Aberconwy Conference Centre, Llandudno, Gwynedd. Amateur radio & associated electronics hobbies, large bring & buy stall, 11am market. Details Derrick Watts, tel: Gwynn Bay S3DD41.

### 15 NOVEMBER

\*Bridgend Rally - Bridgend Recreation Centre, Angel Street, Bridgend. Opens at 11am (10.30am for disabled visitors), usual traders. Talk-in on S22. Details G4IOP, tel: 0656 723509.

\*Bishop Auckland ARS 4th Annual HamDay Rally - Elm Road Working Men's Club, Shildon, Co.Durham. Opens 11am, usual traders, bring & buy, raffle, refreshments & bar. Talk-in on S22. Details G4OHZ, tel: 0325-314638.

### 22 NOVEMBER

\*West Manchester RC Winter Rally - Penbreka Halls, Mirkton. Opens at 10.30am, usual traders and lectures. Talk-in on S22. Details G1100, tel: 0204-24104.

IN BRIEF - More details later.

### 6 DECEMBER

\*Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 59318.

### 13 DECEMBER

\*Leeds & District ARS Christmas Rally - Pudsey Civic Centre, Dawson's Corner, Pudsey, nr Leeds. Details G4MYD, tel: 0274-685039.

### 1988

### 24 JANUARY

\*Oldham Amateur Radio Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details Cathy, G4ECP tel: 061-652 8617.

### 31 JANUARY

\*26th MARSA Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Details Peter G5GCF, tel: 051-630 5790.

### 27 FEBRUARY

\*Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Details Bob GILKE, tel: Medway 362154.

### 5 MARCH

\*Blue Star Rally - Venue to be announced. Details Lynsade ARS, 13 Lothian Court, Newcastle, Tyne & Wear HE5 3T2.

### 13 MARCH

\*South Essex ARS Mobile Rally - The Paddecks Community Centre, Canvey Is, Essex. Details G0BSN, tel: 0268-755350.

### 1 MAY

\*RSCB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.

### 2 15/16/17 JULY

\*RSCB 75th ANNIVERSARY NATIONAL CONVENTION - 2  
National Exhibition Centre, Birmingham. Details 2  
RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563

### 28-31 JULY

\*AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ, tel: 01-989 6741.

### 28 AUGUST (Provisional)

\*RSCB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563.

### 25 SEPTEMBER

\*RSCB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSCB.

## OTHER EVENTS

### 8 SEPTEMBER

\*Rugby Amateur Transmitting Society Auction & Barbecue - Cricket Pavilion, 811 Radio Station, Hillmorton, Rugby. Details Kevin G8TMH, tel: 0788-77986 (even).

### 7 NOVEMBER

\*BARIQ Annual General Meeting - The Churchill Room, Lenden House, Mecklenburgh Square, London WC1 starting at 2pm.

### 5 DECEMBER

\*RSCB ANNUAL GENERAL MEETING - Venue to be announced.

## GB Calls

The list below shows ALL the special event stations licensed for operation during September - (as at press date)

It is taken direct from the GB Calls list on the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication, ie. this month's list was taken on the 3rd of August. If you have an event which is taking place during the latter part of the month of issue, you must send your form in to Headquarters at least 10 weeks in advance to ensure that it can be processed ready for the listing, otherwise it will miss the copy date.

### 1 SEPTEMBER

GB0TV5 - THREE COCKS VINTAGE SOCIETY: Boatside Farm, Hay-on-Wye, Powys. Details G4OKJ.

GB0Y15 - YOUTH TRAINING SCHEME: The Training Centre, Swanssea, W Glamorgan. Details G4XLE.

GB18SS - BEESTON SEA SCOUTS: Scout HQ, Beeston Rylands, Lincs. Details G1WBZ.

GB1CDE - COASTAL DEFENCE \*E\*: Fort Purbrook. Grid: SU 670 664. Details G60TY.

GB1RSC - ROYAL STAR & CARTER: Richmond, Surrey. Details G1DAR.

GB2ATC - AIR TRAINING CORPS (115 SQN PETERBOROUGH): Westwood, Peterborough. Details G4PYR.

GB2CFH - G13CFH: Claudy, Co.Londonderry, N.Ireland. Details G1AOUN.

GB2GDD - CALA OPEN DAY: St Marys Church, Leyland, Lancs. Details G4ZYH.

GB2REW - ROYAL ENGINEERS WARRANT: Brompton Barracks, Chatham, Kent. Details G3XRE.

GB4EMC - ENFIELD MAYORS CHARITY: Enfield Town Park. Details G4KZD.

GB4TRC - TELFORD (MOBILE) RALLY GROUP: Telford Racquet & Fitness Centre. Details G3UKV.

GB6BC - BELVOIR CASTLE: Belvoir, Grantham, Lincs. Details G4VVA.

### 2 SEPTEMBER

GB2SSR - STOURPAINE STEAM RALLY: Stourpaine, nr Blandford, Dorset. Details G6GTY.

### 3 SEPTEMBER

GB2DMS - DEAL/WALMER/SANDWICH: National Scout Camp, Kingsdown, nr Deal, Kent. Details G4CAN.

GB2HOS - MARY QUEEN OF SCOTS: Stirling Castle, Stirling. Details G4MHN.

### 4 SEPTEMBER

GB0CDX - COASTAL DEFENCE \*X\*: Golden Hill Fort, Freshwater, IOW. Details G3RJK.

GB1CDO - COASTAL DEFENCE \*O\*: Southsea Castle, Southsea, Portsmouth. Details G1UMB.

GB2AIP - ADVANCED TURBO PROP: British Aerospace Woodford, Stockport. Details G4XTD.

GB2KAS - KEIGHLEY AGRICULTURAL SHOW: Victoria Park, Keighley, W.Yorks. Details G0BBE.

GB2LRS - LUDGION RADIO SOCIETY: Hastingwood, Harlow, Essex. Details G4FKI.

### 5 SEPTEMBER

GB0DPP - DYFED POWYS POLICE: Llangunnon, Carmarthen, Dyfed. Details G3WXA.

GB0RAF - 101 SQUADRON ASSOCIATION ANNIVERSARY: Ludford, Lincs. Details G3YFU.

GB0RFT - ROTARY FESTIVAL OF TRANSPORT: Margam Country Park, Port Talbot. Details G4YNU.

GB0KEN - WEN CARNIVAL: Wen Sports & Social Club, Bemers Field, Wen, Salop. Details G0CDS.

GB2CAS - GREAT AYLESFORD SHOW: Sports & Leisure Complex, Newton Aycliffe, Co.Durham. Details G4OHZ.

GB2SRC - SURREY RAYNET GROUP: Stoke Park, Guildford, Surrey. Details G4BCY.

GB4HFV - HAYWOODS FRUIT AND VEG: Jubilee Playing Fields, Little Haywood, Stalford. Details G0GUF.

# Events Diary

**6 SEPTEMBER**  
CBOWKS - WEST KENT SOCIETY: 7th Angel Centre, Innbldg, Kent. Details G40IV.

**7 SEPTEMBER**  
CBOWCR - WIMSTANLEY COLLEGE RADIO: Billings, nr Wigan. Details G4KHC.

**CB8ND5** - NORTHAMPTON DISTRICT SCOUTS: Overstone, Northampton. Details G8NPU.

**9 SEPTEMBER**  
CB4755 - THE SPASIFIC SOCIETY (SHEFFIELD): Spastics Society, Outbridge, Sheffield. Details G0C01.

**70 SEPTEMBER**  
GBOCDE - COASTAL DEFENCE "E": Fort Purbrook, Grid: SU 678 054. Details G0DZL.

**GB0RAF** - ROYAL AIR FORCE: Lincolnshire Showground, nr Lincoln. Details G4NVD.

**GB2CDW** - COASTAL DEFENCE "W": Grid: SU 589 069. Details G0GIA.

**GB2NSR** - NORFOLK SCOUT RADIO: Eaton Vale Campsite, Eaton, Norwich. Details G0CLR.

**GB41AC** - THORNABY AERONAUTICAL CENTRE: Thornaby-on-Tees, Cleveland. Details GDBIA.

**17 SEPTEMBER**  
GB2CSC - CUB SCOUT CHALLENGE: Rowell, Essex. Details G0ELM.

**GB2HCS** - HOPENILL CAMP SITE: Hoopham, Kent. Details G4YCU.

**GB2KCR** - KEMPSEY COMMON RALLY: Kempsey Common, Worcs. Details G4P02.

**GB2NM** - G2NM (GERALD MARCUS): Chalk Pits Museum, Amberley, Arundel, W. Sussex. Details G4EMC.

**GB4BN** - BRITISH NATURE: Stoke Moly Cross, Norwich. Details G0GFC.

**GB41BM** - IBM (GREENOCK OPEN DAY): Spango Valley, Greenock. Details G0ETC.

**GB4SGF** - SPORTS GOODY FESTIVAL: Royal Victoria Park, Bath. Details G3FTH.

**GB6RAF** - ROYAL AIR FORCE: Wigston Magna, Leicester. Details G6PFH.

**12 SEPTEMBER**  
GBDHHP - HEREFORD WOODPECKER: The Racecourse, Holmer, Hereford. Details G4WEU.

**GB0SSC** - STROUD SEA CADETS: "IS Severn", Stroud, Glos. Details G4KWK.

**GB2ERR/GB6ERR** - ESSEX ROVER RESCUE: Salvation Army Farm Colony, Madingley, Essex. Details G4ZPE.

**GB2NLC** - MAGNUM LEISURE CENTRE: Irvine, Ayrshire. Details G0GECU.

**GB2OCA** - OSEA ISLAND: Blackwater, Essex. Details G0GCP.

**GB2WHF** - WINScombe MICHAELMAS FAIR: Winscombe Village Hall. Details G4SIY.

**GB4SC** - SHUTTLEWORTH COLLECTION: Dids Warden Aerodrom, nr Biggleswade, Beds. Details G4ENB.

**73 SEPTEMBER**  
GB2YF - YESTERDAYS FARMING: 4 miles SW of Yeovil, Somerset. Details G4WMD.

**14 SEPTEMBER**  
GB0CDG - COASTAL DEFENCE "C": Fort Comer, Gosport. Grid: SZ 587 989. Details G0AYZ.

**GB2POU** - PHYSICS (A1) QUEEN'S UNIVERSITY: Belfast, N. Ireland. Details G1AWN.

**GB4HCA** - HIGH CHRISTIE ANNIVERSARY: High Christie School, Kent. Details G32UN.

**15 SEPTEMBER**  
GB4SAD - SCILLONIAN AIR DAY: St. Marys, Isles of Scilly. Details G0AEA.

**76 SEPTEMBER**  
GB8MS - MOINERWELL SCOTLAND: Wrangholme Hall, Northampton. Details G4MTH.

**77 SEPTEMBER**  
GB1COL - COASTAL DEFENCE "L": Lumps Fort. Grid: SZ 647 980. Details G6XJR.

**GB2CHF** - COR HEIBION FRONCYLLITE: Chirk Castle, Clwyd. Details G4XZU.

**78 SEPTEMBER**  
GB000Y - COASTAL DEFENCE "Y": Fort Nelson. Grid: SU 628 069. Details G0GIA.

**GB1RLD** - RADIO LINK DERBY: City Hospital, Derby. Details G1UJX.

**GB2RA** - RAILWAY AMATEURS: Dinting Railway Museum, Glossop. Details G4CNO.

**GB4RNC** - ROBIN HOOD CAMP: Mansfield, Hotts. Details G4CYU.

**19 SEPTEMBER**  
GB2B08 - BATTLE OF BRITAIN: RAF Finningley, Doncaster, S. Yorks. Details G4ZNO.

**GB4NPC** - NATIONAL PARKS CAMPAIGN: Chatsworth Park, nr Belper, Derby. Details G4U00.

**20 SEPTEMBER**  
GB4JSD - JOIN7 SERVICE DAYS: RAF Cosford, Wolverhampton. Details G4VXC.

**GB4NSY/GB8NSY** - NEW SCOTLAND YARD: Buckingham Gate, London SW1. Details G4LJU/G8IDK.

**27 SEPTEMBER**  
GB2DRH - DUDLEY ROAD HOSPITAL: Birmingham B18. Details G4OMP.

**22 SEPTEMBER**  
GB0CDB/GB1CDB - COASTAL DEFENCE "B": Fort Brockhurst, Gosport. Grid: SU 597 020. Details G4LIX/G1705.

**23 SEPTEMBER**  
GB7CDG - COASTAL DEFENCE "G": Fort Gomer. Grid: SZ 587 989. Details G6MAK.

**24 SEPTEMBER**  
GB1CD7 - COASTAL DEFENCE "7": Fort Nelson. Grid: SU 607 077. Details G8P00.

**25 SEPTEMBER**  
GB2FHP - FERROBO HOBBIES & PASIIME: Chapel-en-le-Frith, Stockport. Details G0GEB.

**GB2NIS** - NATIONAL TRUST FOR SCOTLAND: 1st of Iowa, Argyll. Details G4MTH.

**GB2RCC** - RADIO CARAVAN CAMPING (CLUB): Stanford Park. Grid: SP585790. Details G4EPN.

**GB4HH** - HILWICK HALL: Wallingborough, Northants. Details G0EAE.

**26 SEPTEMBER**  
GB00RM - DARLINGTON RAILWAY MUSEUM: Darlington. Details G6PRV.

**GB2NIB** - NORFOLK INVALID & BLIND: Attleborough, Norfolk. Details G4CJC.

**GB4DJ** - DIAMOND JUBILEE (BREDHURST SHELTER): Sittlingbourne, Kent. Details G3DXN.

**GB4LB** - LIFE BOAT: Mordenhead Low Hall, Berks. Details G4P1J.

**27 SEPTEMBER**  
GB0CIT - CRANFIELD INST. OF TECHNOLOGY: Cranfield, Beds. Details G0GOF.

**28 SEPTEMBER**  
GB2RNX - ROYAL NAVAL AUXILIARY (SERVICE): Nilford Haven, Dyfed. Details G4N7U.

## RAE Courses

This is a list of all RAE courses and Morse classes notified to RSCB HQ (as at press date). It is given in alphabetical order of town or area.

**BIRMINGHAM**  
Nilford Centre, Yockleton Road, Lea Village, Birmingham B33. Thursday evenings commencing 3 September. Details from the centre on D27-783 5598.

Selly Park Adult Education Centre, Pershore Road. Morse class on Wednesday evenings commencing September. Details Roy Williams on 021-475 8403.

Mythall RC, Mythall House, Mythall Park, Silver Street, Mythall, S. Birmingham. Thursday at 7.30pm commencing September. Tutor Colin, G6APS. Details from Chris, GDEYO on 021-430 7267 or 0THR.

**BRENTFORD**  
Brentford School, Clifton Road, Brentford, Middx. Thursday evenings commencing 24 September. Details Brentford School Community Education Office on 01-560 6292.

**BRIGHTON**  
Brighton College of Technology, Pelham Street, Brighton. Commencing in September. Tutor Mr P D Simmons, G3XUS. Morse class will be arranged if sufficient demand. Enrolment at Pelham Street 7/8 Sept. Details from Mr S E Miller at the college on D273-G58971.

**BRISTOL**  
Brunel Technical College, Ashley Down, Bristol BS7 9BU. Monday evenings - Radio Amateur theory. Tuesdays - Morse. Thursdays - Practical. All courses commence September. Enrolment 8/9 Sept at college. Tutor Phil Brouder, G3ZJN. Details tel: D272-41247 ext 2164.

**BRIXTON (LONDON)**  
Brixton College, Ferndale Road, London SW4. Wednesday evenings commencing 23 September. Enrolment w/c 74 Sept. \*External candidates accepted for examination\* Details from the college on 01-737 2323.

**CAMBRIDGE**  
Colinridge Community College, Radgund Road, Cambridge. Morse classes on Mondays. Details from the college or G3BYW.

**CHINGFORD (LONDON)**  
Friday Hill House, Simmons Lane, Chingford, London E4. Commences 17 September at 7.30pm, enrolment on first night. Tutor Alan, G8EAY. Details from centre on 01-529 3380.

**GLACON**  
Clacton Adult Education Centre. Venue for class will be Golbeynas High School, Pathfield Road, Clacton. 30-week course on Wednesday evenings commencing 23 September. Enrolment 7-18 Sept at Centre in Green Lodge, 180 Old Rd, Clacton. 75-week Morse class on Tuesdays commencing 22 September. Details from the centre on Clacton 424157 or the tutor Mr J Harris, G3LMM on Clacton 432621 (day).

**CRAWLEY**  
Ifield Community College, Lady Margaret Road, Ifield, Crawley. Mondays commencing 27 September, enrolment 7/9 Sept 7-9pm. Details from tutor G3LMM on Crawley 24007.

**CROYDON**  
Addington Adult Education Centre, Addington High School, Fairchild Avenue, New Addington. 20-week course on Wednesdays 7.30-9.30pm commencing 30 September. Enrolment Saturday 19 September 9am-7.30pm. Details tel: 0689-41467.

Ashburton High School, Shirley Road, Croydon. Wednesday evenings commencing September. Details from the school or from G4AVV (Q7HR).

Croydon College, RAE Monday evenings, Morse Thursday evenings both commencing September. Details 7pm, G3EUU on 01-668 7725.

**FAREHAM**  
Fareham Adult Education Centre, Wickham Road, Fareham. 28-week course on Fridays commencing 25 September. Short 12-week revision course for December exam on Mondays commencing 14 September. Details from G3CCB on Fareham 288139 or the centre on Fareham 280709.

**GUILDFORD**  
Guildford College of Technology, Stoke Park, Guildford, Surrey. Mondays commencing 14 September, enrolment 7/8 Sept 2-4pm and 6-8.30pm. Details Mr E Purse, G7RNV at the college on 0483-31251.

**HALESOWEN**  
Halesowen College, Whittington Road, Halesowen, West Midlands, B63 3NA. 30-week course on Thursday evenings 7-9pm, commencing 24 September. Enrolment 8/9 Sept at college. Details Colin Prior, G6071 tel: D27-SSD 1475.

**HEMEL HEMPSTEAD**  
Dacorum College of Further Education, Marlowes, Hemel Hempstead. Commences September, enrolment 7 Sept 2-4pm and 6.30-9pm. Details from college on 0442-63771 or Brian, G4BIP on 0442-66337.

**HUNTINGDON**  
Huntingdon College, California Road, Huntingdon, Cambs. 36-week course including Morse, Wednesday evenings commencing September. Enrolment 8/9 Sept. Details from the college on 0480-52346.

**KIDDERMINSTER**  
Kidderminster College, Mao Road, Kidderminster. 29-week course commencing 23 September, enrolment 7/8 Sept 2-4pm. Details from Denis, G0DAA or from Head of Dept. Science & Technology at college on Kidderminster 82DB11.

**LEAMINGTON SPA**  
Mid-Warwickshire College of Further Education, Warwick New Road, Leamington Spa. 30-week course commencing Thursday 77 September. Enrolment 7/8 Sept. Details from the college on 0926-317171.

**LEEDS**  
Alfreda & Wharfedale College of Further Education, Horsforth, Leeds. Morse class Mondays commencing 21 September, enrolment 6/9/10 Sept. Details from the college on 0532-581723 or Golf Denby, G3FCW on 0532-585044.

**LIVERPOOL**  
Nabal Fletcher Centre, Sandown Road, Liverpool 15. Two evenings a week commencing 74 September. Enrolment 8 Sept. Details from the tutor, Mr Loughlin, at the centre on 057-733 7271 extn 37.

**LOUGHBOROUGH**  
Loughborough Technical College, Radmoor, Loughborough, Leics. 26-week course on Tuesdays commencing 15 September. CW & RAE courses. Tutor Jerry, G30MK. Details from college on 0509-275831.

**MANCHESTER**  
Pendlebury High School, Cromwell Road, Swinton. Mondays at 7.30pm commencing end of September. Details G4HYE (tutor) tel: 061-794 3706 or from Swinton Adult Ed. Centre on 061-794 5798. Also Morse classes on Tuesdays at 7.30pm commencing end of September. Details from the Centre.

North Trafford College of Further Education, Talbot Road, Stretford. Monday or Tuesday evenings or Wednesday mornings - tutor Mr J J Beaumont, G3HGD. Morse code class Tuesday evening or Wednesday afternoon. Advanced Morse on Monday evening - tutor Mr D Bradshaw G4UKK. Enrolment 2/3/4 Sept. Details from college on 061-872 3731.

Nilton High School, Longshaw Drive, Little Nilton, Worsley. Wednesdays at 7.15pm commencing end September. Details from Jim, G6EBR on 0942-883729.

**MARKEET HARBOROUGH**  
Welland Park College. Wednesday evenings commencing September. Details from G4ZTY on D858-62827 or the college on 0858-63645.

**MELTON MOWBRAY**  
Hn7ton Mowbray College of Further Education. Tuesdays 7pm commencing 8 September, enrolment 2/3 Sept at college or on first night. Details from the college or from Knn, G3MKN on Leicester 608596.

**NILTON KEYNES**  
Nilton Keynes & DARS. Morse classes in three grades. Details from Roy, G37LE on D908-607265.

**NOTTINGHAM**  
Arnold & Carlton College of Further Education. Wednesday evenings commencing 76 September. Short course for December exam on Thursdays commencing 17 September. Morse classes Wednesday commencing

(cont next page col.3)



# CROSSBAND LADDER

Callsign	Countries	Best DX	Pos
G2ADR	23		1
GW1SSQ	16		2
G0GZI	14		3
G1SEP	13		4=
G4IDE	13		4=
G4ELY	13		4=
G1KDF	12		7=
G4SUG	12		7=
G4INL	11		9
G8DKF	9		10
G4GDY	8		11
GW3WSU	6		12=
G8PYP	6		12=

It's nice to see more people responding to the 'Crossband Ladder' item this month - do keep the entries coming in. As you can see, several stations have tied for positions, so in order for us to judge matters a little better next month, we'd like you all to give us the 'Best DX' as distance in kilometres. Don't forget that the ladder is cumulative so you'll have to keep sending the cards in if you manage to work any additional countries. Cards should include your callsign, name, the number of countries worked crossband from 50

MHz to any other band and the best DX in terms of distance in km.

Send the cards to David Gough, G6EFQ, News & Information Department at RSGB HQ. If you prefer to use the Mailbox facilities, that's fine.

DON'T MISS THE MAIL - AGAIN!

Yes, we KNOW we said it'd be in this month. Yes, we KNOW it's been held over once already. It's just that the two big stories in this month's Bulletin - on licensing and the reorganisation of the Society's representation scheme - ate up an awful lot of space, and it was a matter of choosing which two out of the three things to print.

After a lot of tooth-sucking and too much coffee, we thought it was more important to let you know about the licence review proposals and the representation scheme at this stage - so our special packet radio feature has been held over yet again. We like packet, honest, and the Chief Executive (who likes it even more) will fire us when he finds out but .....

It'll be in next month's Bulletin without fail.

(continued from previous page)

16 Sept. Other cTosses include Constructional Practice, Introduction to the RAE, After the RAE, and Foreign Languages for the Radio Amateur. Details from the college on 0602-876503. Enrolment for all courses on 7 Sept 10am-8pm and 8/9 Sept 2-8pm, or by post or by attending first class of session.

## PORTSMOUTH

Adult Education Centre, Drayton Road, North End, Portsmouth. Course now in its 42nd year will commence in September on Tuesdays and Thursdays. Details from Leon Newham, G6NZ on Portsmouth 879968.

## RHONDDA

Rhondda College of Further Education, Llynwypio, Tonypandy, Mid Glamorgan G40 2TQ. 30-week course, probably Monday evenings commencing September. Enrolment 7 Sept, early application advisable. Details from college on 0443-432187.

## RUGELEY (STAFFS)

Rugeley Evening Institute. 33-week course on Thursday evenings commencing 24 September. Enrolment 7/8 Sept 7-9pm. Details John Teece, G4OBR, GTHR, STEVENAGE

Stevenage & OARS HQ., SITEC Ltd, Ridgemonk Park, Telford Avenue, Stevenage. Commences Tuesday 6 October 7.30pm. Details Peter, G6GTE on Stevenage 724991 or Prestel Mailbox 219994795.

## STOCKPORT

Avondale Evening Centre, Heathbank Road, Edgeley, Stockport. Tuesdays commencing September, enrolment 14-17 September 7.15-8.15pm. Details from Mr G R Franklin on 061-477 2382 or Rik, G4WAU on 061-427 4730. Proposed CW cTosses on Mondays.

Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire. 25-week course on Mondays commencing September. Horse classes in 25 sessions on Thursdays commencing September. Enrolment for both on 14/15/17 Sept from 7-9pm. Details from course tutor Dave Wood, G4UJO on 0606-41511 from 12.30-1.00pm weekdays.

## WALSALL

Borr Beacon Community School, Old Hall Lane, Aldridge, Walsall. 12-week course commencing 10 September. Enrolment from 6.30pm on first night. Details from school on 021-360 8345.

## WARRINGTON

Groppenhall Community Centre, Groppenhall, Warrington. Wednesdays commencing 2 September at 7.15pm. Details from Guy, G8NRF or Ken, G4XQA.

## WILSON

Wigan College of Technology, Parsons Walk, Wigan. 7pm on Wednesday evenings starting in September. Horse code class also planned if sufficient numbers. Details from Roy Hesford, G4UAE at the college.

## RSGB MIDLANDS VHF CONVENTION 1987

Madeley Court Centre, Telford, Shropshire

SATURDAY 10 OCTOBER

Doors open 10am

### LECTURE PROGRAMME

- 1200 - 1330: RSGB RMG Open Forum
- 1330 - 1345: Opening Address by Malcolm Appleby, G3ZNU
- 1345 - 1455: Advanced Long Yagi Design by Ian White, G3SEK
- 1455 - 1605: Design of Commercial Equipment for the Amateur Market
- 1605 - 1715: The Ins and Outs of Microwave Amplifiers
- by Barry Chambers, G8AGN
- 1715 - 1900: VHF Forum

The forum will be followed by an evening buffet and bar (open until 2200) and there will be lunchtime catering in the form of snacks and a bar. There will be a small trade show, bring & buy stall and a bookstall.

ADMISSION - £1.20

BUFFET - £5.50 by advance booking only.

AMPLE FREE PARKING

The Convention site is readily accessible via the M54 Motorway and talk-in will be provided on S22 by G1SCR/A. A map is available from the address below on receipt of a stamped addressed envelope.

The RSGB Midlands VHF Convention provides an excellent opportunity to meet fellow VHF, UHF and Microwave enthusiasts in comfortable, uncrowded surroundings.

Details from: Mr J P H Burden, G3UBX  
18, Langley Road  
Merry Hill  
Wolverhampton WV3 7LH

### RAYNET NEWS:

In the May issue, a call for nominations for Raynet Zone 9 (Hereford & Worcester, Shropshire, Staffordshire Warwickshire and the West Midlands) was made. Two valid nominations were received by the closing date, but since then, one of the candidates has withdrawn his nomination for personal reasons.

The new Zone 9 Representative is Mr J Gregory, G4PFO who is elected unopposed.

### CALLBOOK STORY:

The Winter 1987 edition of the Callbook will be published on 22 November. This is a touch later than usual because feedback from members suggests that you want an even bigger and better publication and that's what we're aiming to give you. The next one after that will be the Summer 1988 edition, published a few weeks before our 75th anniversary. This will be the Callbook to end all Callbooks but plans are highly classified at the moment - more later on!



# NEWS & VIEWS

## HF

John Allaway, G3FKM\*

ONE OF THE greatest rewards to be gained from amateur radio is international friendship. I often wonder just how many other activities one could take part in where it is possible to arrive in a strange country, far from home, and be met by a group of like-minded friendly people? A few weeks ago I had the luck to be in Malaysia, where I had the great good fortune to be met by Sangat Singh, 9M2SS, secretary of MARTS, at whose home I spent a couple of days. From there I was taken to visit 9M2GV (on the way to a lunch rendezvous with 9M2WT) and then on to Kuala Lumpur where I had the pleasure of attending a dinner, organised by MARTS, and meeting quite a few more 9M2s—including an old over-the-air friend Esheq, 9M2FK, who has one of the most consistent signals into the UK. Much time was also spent with Devan, 9M2DD, president, and David, 9M2DT, who is a council member of the society. A wonderful experience and one of the highlights of my amateur radio career!

John Allsopp, G4YDM, QT11R, says that he is collecting used stamps to finance the purchase of a secondhand transceiver for a disabled amateur. He would appreciate help—send direct to John please.

### Forged 1rcs

It seems that a number of forged 1rcs are around. When compared with the real thing they are obviously forgeries, but they may pass as genuine if seen in isolation. The differences are quite marked and include the following: (a) the forgeries do not have the UPU watermark; (b) they are very slightly larger, and (c) they are on paler paper and printed in lighter ink. One sent to me has "Control UPU" stamped in the office of issue space. According to *DXpress*, the Post Office Director at Munich has also noted varieties with a smaller "glbne" emblem, but this does not apply to my example.

### DX news

*Long Skip* reports that at the time of the Dayton Convention, Iris Colvin was still confined to a wheelchair but she was in good spirits and recovering rapidly from her accident and operation while on the YASME Indian Ocean expedition.

Finnish stations have been using the OF prefix. This marks the 75th anniversary of the Finnish state. The 4X1 prefixes now being heard belong to the new advanced-class licensee holders in Israel.

A QSL and letter received at HQ in late May from 9N1MC contained the information that Krishna is often active (except on Saturdays) on ssb near 14,200, 21,200 or 28,600kHz between 0900 and 1300, but sometimes from 0500 to 1500 with his beam IC751 and three-element tri-band Yagi. He says that he also has dipoles for 3.5MHz and 7MHz. As chief engineer at the Ministry of Communications in Kathmandu, Krishna is in charge of issuing licenses in Nepal, and says that World Telecommunication Day this year was marked by the issue of a licence for 9N7ITU to members of the Japan UNICEF Ham Club JH8BKL, JA8RUZ and JO1AIA who operated from 17 to 19 May on 7, 14, 21 and 28MHz ssb, cw and rty. The club has been issued licences on two previous occasions—9N5HCK (from 30 July to 4 August 1984) and 9N5YDY (from 23 to 31 December 1986).

N4TX advises that the team which normally operates K3KG will be visiting Jamaica for the CQWWDX Contest in October. They will be on the air before the contest on cw, and they will be on the WARC bands—callsigns to listen for are 8P9s HQ, HR and HS. K4BAI will operate from the same location in the November cw section as 8P9HT.

G3CWI should now be on a nine-month assignment in Chile. He expected to have to visit Juan Fernandez for one week, but didn't know when. However, he is hoping to operate from Wollaston Is later in the year. CE0s GHO and FFD have been good signals on 14MHz, and both are on Easter Is. CE0FFD was inviting skeds on 14, 21 and 28MHz between 2000 and 2359, his address is Box 4, Easter Is, Chile. VP8BNO was very active on the lower frequency bands at the time of writing, and was due for leave in the UK and

hoping to return to VP8 with more equipment. V44KT is said to have a sked with QSL manager WA4W1P daily at 1100 on 14,218kHz ssb. WA2TT1/OX now has the callsign OX3GH and is near 14,200kHz most days after 2300.

According to *DX News Sheet* there are reports that A51PN has been worked on 14MHz ssb. The same source says that XU1SS looks for Europe at 1130 on Tuesdays, Thursdays, Saturdays and Sundays on 21,170 or 21,230kHz. V85AC and V85CW often work together after 1230 between 14,005 and 14,030kHz, and Oliver, ex-TR8PO, is now V85PO and active on 14MHz between 1500 and 1700. V85HG keeps skeds on 14,202kHz at 1500 and on 14,190kHz at 2300 on Sundays, and he is willing to try rty after he has finished.

DXCC credit for contacts with "4W1AA" is unlikely as NSGJL had no documentation. *Long Skip* reports that K8PYD will be spending five weeks this autumn travelling through China, Nepal, Sikkim, Bhutan, India and Hong Kong, and will operate from as many as possible. From China, BY5RA has been reported as to be found almost daily on 21,027kHz at 0700. JT8KNA, giving his location as Bayanhangor, has been worked on 14MHz cw in the UK. *DX News Sheet* says that UA6JD and the RSF of the USSR have stated that there will be no YA operation in the foreseeable future. A61AB has become increasingly active and often meets his QSL manager WA3HUP on Tuesdays and Wednesdays on 14,243kHz at 1500.

The expedition to Palmyra Is by DJ8NK, F6EXV, WA2MOE and others forecast for this month has been postponed, probably until March 1988. ZL81IV on Raoul Is can be found between 14,180 and 14,200kHz from 0500, but is due to leave on 1 October. C21A has been worked on 14,185kHz at 1230, and is often joined by C21FS. P29AP and P29PR are often to be found around 21,020 or 21,165kHz at 1000 working into Europe. EP2DL appears to be genuine and QSLing, and EP2ASZ has also been worked.



A92BE enjoying himself in the 1986 CQWWDX Contest

592LB is said to listen around 14,157kHz at 1930, and sometimes can be raised by giving a "blind" call. 3C1MB is halfway through his three-year tour of duty and has already made over 12,000 QSOs. Anyone still needing a QSL for a contact with ZD8FX a few years ago is invited to write to GM3VBY (see "QTH Corner"). FT8XD is active on 18MHz most weekends, and also on 14MHz cw. FH8CB has 90W on a three-element beam and frequents 14,235kHz between 0400 and 0600 on Sundays. *Long Island DX Bulletin* says that ZD9BV is near 21,265kHz most days from about 1700. A new station in Mauritania is 5T5EV who seems to be on most evenings on or above 21,300kHz. FB1LDX, who was due to go to Tchad, was told that amateur radio is suspended in that country until further notice.

June "QTH Corner" listed the QSL address for ZC4AK as via G3VHE. However, it seems that this only applies to contacts made before April 1985—for those since, please send to the address in this month's list.

Cav Thursby-Pellham, G4MBF, is also VK6YX and holds the callsign VK9YC for use on Cocos-Keeling Is.

### Other news

The South African Radio League has written to a number of those who have sent cards for contacts with people pirating ZS callsigns. G3KXF has sent along his copy of the letter which says: "Recently our QSL bureau has been receiving QSLs for questionable ZS stations. We can only assume that there are persons unknown operating the hf bands using pirate callsigns. To substantiate this assumption, the following facts are recorded:

(1) ZS7. This prefix was only issued early in 1987 as a special prefix for any future Marion Is operations. No legal operation has taken place since the time of allocation.

\*10 Knightlow Road, Birmingham B17 8QB.



G4JVG presenting Chiltern DX Club Certificate of Merit to Einar, LA1EE, 3Y1EE



A gathering of dxers at G4JVG/SM0's QTH. L to r: Lars, SM0CCM; Bill, W6 awl; Eva, G4JVG xyl; Ull, SM5BBC (hidden); Rusly, W6OAT, (ol Clipperton fame; Nan, SM5BBC xyl; Eva, SM0DTG, xyl of SM0AGD; Erik, SM0AGD; Rune, SM0COP/KB1Q; Helde, SM0NZG xyl of SM0COP; and Gunnar, SM0AVK

(2) ZS0. This prefix is not issued under any circumstances, attempts to have ZS0 allocated in the South African Antarctic stations have been fruitless and the South African licensing authorities recently denied such a request.

(3) ZS5FRO. While there are some ZS5 three letter suffix calls, this one is not listed in our list of amateur callsigns and is not a valid call.

(4) ZS6FRO. As ZS5FRO.

**CRRI.** News reports that Leonid Labutin, UA3CR, a well-known polar explorer, will be with a group of USSR and Canadian scientists crossing the North Pole on skis next February. The expedition will begin in Novaya Zemlya in the Soviet Union, and end at Cape Columbia near Alert (on Ellesmere Is). Leo has advised that the expedition will use a 10W transceiver on the 3.5, 7 and 14MHz bands, and possibly some equipment for communicating through the Oscar satellites. A number of Canadian amateurs have already been lined up to keep in touch with Leo and the expedition.

Ernie Sumption, G3DQL, was not making his usual trip to The Gambia this summer because, if all things worked out as planned, he will be going to live there and hopefully will be on the air as a permanent resident by the middle of October with his FT101ZD and a three-element beam on a 50ft tower. His QTH will be only about 20 yards from the sea! He may put up a shortened beam for 7MHz, and is hoping to put up a wire of some kind for 3.5MHz, or perhaps tune the tower. Eric will use the callsign C56/G3DQL.

Gwyn Morgan, GW4KYN, is now on a long-term posting to Jakarta, and is hoping to be on the air with a YB callsign in a few months' time.

Keith Orchard, G3TTC (ZD8KO in 1971-74), spent most of May in Hong Kong, and as G3TTC/VS6 worked 42 countries on 14 and 21MHz using an IC735 and dipoles. He returned home by train through China, Mongolia and the USSR, and while in Beijing visited the HQ of the China Radio Sports Association.

Norman Joly, G3FNJ, has just returned from Greece, where the licensing authorities granted him an "honorary" licence (G3FNJ/SV1) for past activities in that country dating back to 1927, and for his participation in broadcasting (from Athens) during the Albanian campaign and subsequently in the Greek language broadcasts from Cairo during the wartime occupation of Greece. He enquired about the position of reciprocal licensing with the UK and was shown a letter to the Greek Foreign Office dated 1981 which had still not been answered!

Sheriden Street, A92BE (better known as "Don"), was disappointed with his score in the 1986 CQWWDX Contest, but intends to try much harder this year. His home call is G3VFU, and he has previously operated from A5, 9G and 9J. He operates on most bands and intends to make special efforts on 1.8MHz during the coming winter using a dipole antenna. Activity from Bahrain varies as amateurs come and go, but currently the more active are John, A92EM, and Mal A92EV. The club station A92C is on the air on the first and second Tuesdays of the month and has an FT980 with TL922 linear (which helps a little) to a three-element beam at 50ft. Don says that the licensing authority could not be more helpful and issues licences with little delay. He enclosed a newspaper article about A92C from the *Gulf Mirror*. There is a repeater which enables contacts to be made with A71BJ, A61AB, A4s and 9K2s.

### Parlez vous Français?

... or how is your French? John Piggott, G2PT, has written to point out the existence of the UFT, the Union Française des Télégraphistes. Their frequent QSOs can be heard around 3.525 and 7.025kHz, and it is an association which encourages cw operators who wish to exchange messages solely in the French language. The club is open to anyone, and in order to join it is necessary to obtain QSLs from five sponsors (parrains) who are already UFT members and with whom the applicant has had a contact lasting at least

### ALL-TIME TABLE WITH DELETIONS No 14

(Table Serial No 21)

Callsign	1.8MHz	3.5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	125	240	308	333	334	318	1,658
G3GIO	70	207	259	336	333	310	1,515
G3NCS	64	212	263	323	324	306	1,492
G3XTT	152	199	240	289	282	248	1,410
G4OYO	66	186	233	313	305	287	1,390
G3UML	31	220	234	334	298	255	1,372
G2DMR	57	181	193	311	310	266	1,318
GW3AHN	16	109	114	364	359	330	1,292
G4FAM	63	180	238	268	268	242	1,259
G4GIR	71	172	210	273	257	246	1,229
G3XQU	48	171	187	297	272	242	1,217
VK9NS	80	184	226	290	243	192	1,215
G4BWP	71	186	211	268	222	240	1,198
G3TXF	62	163	183	260	252	211	1,131
G4LJF	28	198	205	267	235	198	1,131
G3NOF	4	65	82	343	324	278	1,116
G3YMC	78	104	187	238	239	184	1,010
GM3YOR	75	137	183	221	199	181	995 (all cw)
GW4OFO	50	198	181	209	191	135	964
G4OBK	118	109	136	195	169	137	864
GM3PPE	59	137	152	188	168	140	844
<b>Average</b>	<b>66</b>	<b>170</b>	<b>200</b>	<b>282</b>	<b>265</b>	<b>236</b>	<b>1,220</b>

Band leaders in bold type

Next deadline—Current All-Time—to reach G3GIO by 8 October

### 1987 ALL-BAND TABLE No 3

Callsign	1.8MHz	3.5MHz	7MHz	14MHz	21MHz	28MHz	Total
GW4RHW	30	56	69	161	100	22	438
G4OTU	35	36	48	105	83	51	358 (all cw)
GM3YOR	44	53	94	54	39	22	306 (all cw)
4X4FL	—	9	29	47	77	46	208
G4OBK	48	43	57	23	9	1	181
G0FYD	1	5	41	35	20	2	104
G4GOF	7	15	18	47	9	—	96

Next deadline: 8 September 1987 (to G3GIO please).

### 10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	98	68
G4YWG	62	41
G0VDX	71	37
G4UZN	87	32
G4OBK	55	30

### 28MHz COUNTRIES TABLE (1987)

G4JBR	-115	G4NXG/1	-43
G3XOU	-91	G4RWP	-39
G4XAH	-91	G4DXW	-29
G0AEV	-81	GW4TEJ	-27
G0DNV	-70	G0BXO	-24
G4MUW	-59	G5HD	-10 (ORPcw)
G4VPM	-56	GM4CHX	-10
GD4XTT	-52 (ssb)	G0FYD	-2
GD4ELY	-52 (ssb)	G4OBK	-1

15min all in correct French. Calls of "CQ UFT" during weekends or at about 5pm may raise suitable sponsors. Membership costs F.60 per annum, for which news bulletins are sent as well as a diploma. At present there are about 230 members but there are very few foreigners—and G2PT is the first British member. More information from John, QTHR.

## Welcome...

...to the following who became RSGB members during May: C3ILD, DL2BI, DL8KG, E14FD, H1B9BD, HL1IE, IW3QBY, LA3SB, VE3ANO, VS6XQC, YB5NOF, 4X6MP and 9K2SB, also to M Tucker (W6), and O Jallade (F).

Also to these who joined during June: DF7GR, DG0QN, DJ0MN, DL6AB, E14DZ, E17CN, E18FC, HB9GXE, HB9DBH, IK2BDH, I3ZFC, N4DSA, N4KEZ, OZ4RT, SM0GWX, TA2AB, VE3CDM, VE3ORN, VK3JY, VK5ADG, VO1GE, VS6UZ, WB9PYM, 9M2CS and 9M2FP. New listener members were M C Wiffen (W4), F Beeson (A4), D Beckett (DL), G Mazzolini (I) and H Chan (9V).

## Contests

Results of the 1986 CD WW WPX Contest (Phone) have appeared in "CQ" magazine. UK scores are as follows:

Single-operator section					
Call sign	Band	Points	Call sign	Band	Points
G3FXB	All	2,816,182	GB0Q	21MHz	5,650
G4UDL	..	390,852	GM4CXM	14MHz	390,720
GW6TM	..	328,770	GM3RAO	..	293,888
GW4RHW	..	269,000	G3TXF	..	221,949
GW3OKA	..	205,821	G4RFE	..	88,985
G3LRS	..	121,968	GI4BBV	7MHz	121,380
G4OKN	..	164,269	G3XWZ/A	18MHz	5,776
GD0N42C	21MHz	452,250			

Apologies in advance to G4OKN and/or G3LRS—the scores given are as printed in CQ and the real truth is not available!

In the Multi-Operator Single-Transmitter section GB2MM came world ninth with 3,641,550 points, and in the QRP section G3KDB scored 132,821 points in the all-band

## QTH CORNER

BTDCQ	JR1HHL, Toshio Suzuki, 526-11 Iwasawa, Hanno, Saitama 357, Japan.
EP2DL	Davor Alipouri, PO Box 17845/151, Teheran, Iran.
HSOC	JABATG, Box 3, Yakumo 049, Japan.
V47NXX	Paul, Jones Estate, Navis Is, W Indies
VP8AXJ	via G4NFT, 5 Lytchett Way, Upton, Poole, Dorset BH16 5LS.
G3TTC/V56	Keith Orchard, 6 Hurst Close, Chessington, Surrey KT9 1XE.
ZC4AK	[since April 1985] to ZC4 Bureau
3C1CW	J Calvo, F6GXB, 5-10-5 Shimomoguro, Maguro-Ku, Tokyo 153, Japan
Z08FX	GM3VBY, 6 Burnside, Kinross, Forres, Gampian IV36 0XL.
SP9HQ	
SP9HR	via K4BAI, PO Box 421, Columbus, Ga, 31902, USA
SP9HS	
SP9HT	
9M8PV	PO Box 89, Eng No 2, Britulu 97007, Sarawak, W Malaysia
9N7ITU	via JABRUZ, T Kawanishi, Box 166, Asahikawa, Hokkaido 070-91, Japan

section. G4ZFE scored 15,664 points. G3DOP 3, 185 and G3CWL/A 1,320 all on 14MHz. On 3-5MHz G3VMY scored 29,588 points. Callsigns listed in bold type received certificates.

## Columbus Contest

0000 3 October to 2400 4 October

All bands other than 3.5MHz. Modes: cw, ssb, rty sstv or mixed. Single- or multi-operator single- or multi-band—single-operator entrants may only operate for 30h. QRP also for each class (no more than 5W output). Europe works the world and gives RS/T plus ITU zone. I stations also give province. Multipliers are USA and VE states/provinces, and each call area of each DXCC country; each appears to count once only. Bands may not be changed at less than 15min intervals. Use separate logs for each band with 40 OSOs per page. Enclose signed summary sheet and send logs to ARI, PO Box 347, 16100 Genova, Italy. A special station will be on the air from Genoa during the contest with the callsign I0IIC.

## International DX-HC Middle of the World Contest

0000 3 October to 2359 4 October

All bands ssb. Work the world. Multipliers are the sum of the numerals of the HC zones worked on each band, and OSOs with HCs count 10 points, with HDs 20. Multiplier is DXCC countries. Scoring is sum of OSO points times number of multipliers on each band. Four special stations located on the Equator will be active: HD1GRC, HD0GRC, HD7GRC and HD3GRC. Awards to those having 30 OSOs with Ecuador and to those who work a minimum of five HC zones. Enclose live lrcs with log, which should be sent to: Contest Manager, Guayaquil Radio Club, PO Box 5757, Guayaquil, Ecuador, before 31 December.

# HF F-layer propagation predictions for September 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, i.e. 0000, 0200, 0400 etc. The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally, 50MHz F-layer and 1-8MHz openings are indicated by a plus (+) sign in the 28 and 3-5MHz columns respectively.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3.5MHz	
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	
** EUROPE									
MOSCOW			122211..	134444..	56777784..	213655556895	865322223689	+52.....3++	
MALTA			222223..	454456..	477778971	432755557897	987532234689	+52.....4++	
GIBRALTAR			2322241..	6765686..	22..5765686	22..5765686	806643334689	+4.....3++	
ICELAND			111111..	111111..	1454564..	1..256666784	754643334578	+32.....24+	
** ASIA									
OSAKA			111111..	2331..	245431..	232223341..	1.....1451	.....2.	
HONGKONG			1221..	1344311..	25545552..	222124672	.....1474	.....4.	
BANGKOK			1111..	2455311..	23345434..	1.....2124684	2.....1476	.....44	
SINGAPORE			111111..	2455354..	23345684..	1.....12124702	1.....1476	.....43	
NEW DELHI			111111..	2455354..	133445653..	311.....112478	511.....1478	2.....4+	
TEHERAN			121111..	24556651..	2433456892	5331.....112478	841.....1478	2.....4+	
COLOMBO			121111..	244444..	34556611..	1223456562	21.....124787	511.....1478	2.....4+
BAHRAIN			122222..	24445532..	44556751..	12423456853	7431.....124788	851.....1478	+2.....4+
CYPRUS			111111..	24556651..	57777884..	213766667984	866433345799	98421.....12588	+52.....25+
ADEN			1232323..	2455663..	44457761..	2.2322356864	8531.....24798	861.....1478	+3.....4+
** OCEANIA									
SUVA/S				1221..	12444..51..	33222262..	.....31..13..	.....31..	.....4.
SUVA/L				1.....6..	1.....161	.....16311.531	.....31.....3..	.....31.....3..	.....4.
WELLINGTON/S				1111..	34332..1..	.....15322233..	.....31.....141	.....31.....141	.....4.
WELLINGTON/L				1.....42	1.....242	1162.....242	.....11.....31	.....11.....31	.....4.
SYDNEY/S			122..	24411..	555332..	.....133212441	.....11.....1441	.....11.....1441	.....4.
SYDNEY/L				1.....1	2.....34	11231.....23	.....11.....23	.....11.....23	.....4.
PERTH			12..	2441..	13554332..	2.1132123651	1.....1474	.....1474	.....42
HONOLULU				.....2..	.....11..242..	.....133211331	.....231.....11..	.....231.....11..	.....4.
** AFRICA									
BEYCHELLES		1233332..	24556651..	44467773..	2.1322456884	842.....124788	84.....1478	.....1478	+.....4+
MAURITIUS	111221..	1233442..	24566761..	45567883..	111323456884	7421.....123688	841.....1478	.....1478	+.....4+
NAIROBI	112231..	233553..	24557761..	44557884..	2.1422256884	8441.....23688	872.....1478	.....1478	+5.....4+
HARARE	112342..	234564..	25567872..	45557885..	21.532356884	8742.....23688	884.....1478	.....1478	+.....4+
CAPETOWN	112431..	334663..	3567063..	36567886..	643346894	64341.....13688	8851.....1478	.....1478	+3.....4+
LAGOS	112444..	3346661..	3567884..	26558897..	22.642236894	78351.....3688	8072.....378	.....378	+4.....4+
ASCENSION I	11134..	223572..	5545785..	7545888..	12.63223794	781231.....1488	88631.....268	.....268	+4.....4+
DAKAR	112241..	2333462..	5555686..	7535688..	12.263223794	685531.....1488	88731.....168	.....168	+5.....3+
LAS PALMAS	11122..	1221241..	4554575..	6776788..	12.376667895	785754334689	998531111379	.....1379	+2.....4+
** S. AMERICA									
STH SHETLAND	1221..	33431..	156763..	366776..	1..14446674	664432113346	69731.....124	.....124	4+4.....2
FALKLAND I	11241..	133462..	353685..	566777..	1.13444564	685532111247	88731.....14	.....14	5+4.....2
R DE JANEIRO	111131..	332362..	554575..	765778..	12.25422575	7853321..258	88731.....127	.....127	+4.....4
BUENOS AIRES	111131..	223553..	354575..	6655671..	12.15433465	77542211.137	88741.....14	.....14	+4.....2
LIMA	11111..	11122..	43354..	544551..	11.12432245	6742211..14	79741.....2	.....2	4+5.....2
BOGOTA	11121..	11121..	32244..	2533451..	11..4432245	7741221.....15	79731.....2	.....2	4+4.....2
** N. AMERICA									
BARBADOS	111122..	332254..	5534561..	11.15422365	7742321.....37	88741.....4	.....4	.....4	+5.....2
JAMAICA	111111..	332233..	433451..	2432244	6631211..14	68731.....2	.....2	.....2	3+4.....2
BERMUDA	111111..	222233..	2433451..	2433355	7631121..136	78731.....2	.....2	.....2	4+4.....2
NEW YORK	111122..	333341..	433341..	2443354	652..211.125	68631.....2	.....2	.....2	3+4.....2
MEXICO	111121..	1121..	133331	1.....1212	442..111..2	37631.....2	.....2	.....2	4+4.....2
MONTREAL	111112..	11112..	333341	1.....1212	442..1111355	88621.....2	.....2	.....2	3+4.....2
DENVER	111112..	11112..	1212..	1.....1212	331.....122112	26631.....2	.....2	.....2	3+4.....2
LOS ANGELES	111111..	11111..	1111..	1.....111	2211.....221.1	14631.....2	.....2	.....2	4+4.....2
VANCOUVER	111111..	11111..	1111..	1.....111	21111..13331	13531.....1	.....1	.....1	4+4.....2
FAIRBANKS	111112..	11432123322	11331.....11..	11331.....11..	11331.....11..	11331.....11..	11331.....11..	11331.....11..	11331.....11..

The provisional mean sunspot number for June 1987 issued by the Sunspot Index Data Centre, Brussels, was 17.5. The maximum daily sunspot number was 41 on 26 and 28 June, and the minimum was 0 on 3, 4, 6-10 June. The predicted smoothed sunspot numbers for September, October, November and December 1987, are respectively: (classical method), 26, 27, 28 and 29; (SIDC adjusted values) 31, 33, 34 and 35.

# VK/ZL/Oceania Contest

1000 3 October to 1000 4 October (phone)

1000 10 October to 1000 11 October (cw)

Two points per QSO with VK/ZL/Oceania. The multiplier is the number of call areas worked on each band added together, Exchange RS/T plus serial number (from 001). Logs should show date, time, station worked and numbers sent and received. Each new multiplier should be underlined and a separate log sheet used for each band. A summary sheet giving details of name and callsign (in block capitals) as well as details of QSO points and multiplier total for each band and the usual signed declaration. Post to arrive by 31 January 1988 to WIA VK/ZL/Oceania Contest Manager, VK3BGW, 1 Naarabil Court, Greensborough, Vic 3088, Australia. There is a listener section and entrants to this should log date, time, callsign of VK/ZL/Oceania station heard, callsign of station being worked, RS/T of station heard and number being sent. Scoring is the same as the transmitting section but phone and cw count as one contest.



A group of New Guinea amateurs. L to R: P29s AR, ZEF, KSK, MA, PR, EW, and NGW. (Photo courtesy P29AR)

## Band reports

No report from G8KC this month due to the fact that he had not received the solar data for June before press date. However, Smithy promises a special edition next month incorporating June and July figures and in time for the start of the October dx season.

Conditions seem to have been quite encouraging, and the night of 17-18 June saw an excellent opening into W1, 2, 3, 4, and 8 on 28MHz which continued well into the night and early into the following morning. G4JBR has already well exceeded the 100 countries worked this year — will the 200 be reached?

The following kindly sent in logs and information this month: G2HKU, G5JL, GM3CSM, GJ3EML, G3s GVV, KSII, LOL, PIT, YRM, G4s EHQ, JBR, GW4KGR, G4s LRS, MHW, NNG/M, UZN, XAII, GDAEV and GHIJA.

Stations listed in *italics* were using A1A.

1-8MHz 2000 ON7BW, 2200 SP1PEA, 2300 UO2GKL.

3-5MHz 2200 ED9EXP, PY2DP.

7MHz 0000 HG2DA, VP8BNO, 0300 HK6JH, 719CF, ZF1IC, 0400 CE, CO, FPIK1RH, 5A0A, 0500 VK2, 4, 5, ZL2, ZL4, 0600 HK9BRW, LXG4UPS, 7X3AT, 1900 GBOSWRIMM, 2000 ED9EXP, DL7RAG/SV9, 2100 UA0WB, 2200 UM8MO, 2300 PJ7JC.

10MHz 0400 W3, 3, 5, XE1FAA, ZL2AGY, 0500 VK3, 5, W7FU, ZL1, 3, 0800 WOHMS, 2000 C30DAW, 2100 JA3SVGIMM, UA0AG, W1XU.

14MHz 0000 PZ1DV, 3C6HAA, 0200 VP2VA, 0400 W6-W7 (to 0800), 0500 KL7, V2AU, VU2BK, 0600 FOSFO, KH6GS, KH6J 0700 WY5L/KH3, KH5, KL7, KX6QA, P29FG, UA1OT, ZK1CG, 5V7SA, 5W1FT, 0800 H50B, KH6LW/KH7, KL7, SUIER, VR6YL, YIIBGD, ZK1XV, 0900 C2IRK, 5W1FM, 1000 KX6NO, T32BC, 5X5GK, 1100 KH6LW/KL7, 1200 5A0A, 1300 AA7A (Anz), TV6CAS, 1400 A92EM, BV6IA, JAS, VE8RCS, 6T2MG, 1500 BY4SZ, HL1AIC, JAS, 1600 EP2DL, TA2G, VU2TJW, YK1AO, 9M2LE, 9M8PV, 1700 ED9EXP, KH6LW/KL7, RV0HF, ZD7BJ, DK2SC/4S7, 1800



G3TTC/V56 on the air from Hong Kong

AP2KH, HL5TB, HS0B, KL7IYK, TZ0RO, VP8BFY, VS6UP, 5X5GK, 1900 HL1EJ, KX6QR, S92LB, 6W6JX, 9V1WU, 2000 JA, 5V7SA, 5Z4JB, 2100 FY4EE, ZL4FG, 2200 FM5CP, SP5EXA/JW, V47NXX, 9L1GG, 2300 W6JKV/YVO.

18MHz 1900 LUSDJO, 2200 FY5AU.

21MHz 0800 HZ1AB, 0900 9V1WP, 1000 A71BK, TA7A, YB, ZS3L, 1100 FT8WA, 1200 HB0/DA1WA, HL1INX, JA, 1300 A4XJT, TA3C, TR8SA, 1400 NP4Z, 5H3RB, 5T5NU, 1500 CE3LP, T26CVY, 1600 FY7AN, 1700 HL2INX, JY5DL, T26VV, 1800 V44KO, 5H3GI, 5N9BHA, 1900 J25UAC, 2000 HC5AI, JY5DL, ZD8RP, ZY1DF, 9Q5NW, 2100 CE, J39BS, 777C, T19US, V2ACH, W1-W4, 2200 KH6AM, KP2J, T19CF, V31JA, 2300 W1-W4, W8.

24MHz 1400 KA1PE, W5PWG, 1600 ON6CW, 9Y4NW, 1800 GU4RUK, W1XU, 1900 LU2YA, LU9HGW, PY2GCW, 2000 C30DAW, J37AJ, LU1DOW, 2100 KA1PE, KV4AD.

28MHz 0000 CE0FFD, 0700 EA9NN, RF6FIS, TU2QZ, 0800 HZ1AB, 1000 J40DX, UM8MIG, W2LOT, 1100 A71BK, 1200 J28EM, 5T5NU, 1400 W3OPL, 1500 T77J, W1-W3, 4X4FR, 6W6JX, 1600 CU2BR, ED9EXP, PY, T1JDL, VE1CYL, 3C1MB, 5H3RB, JY1FOS/5N0, 1700 CN2AO, QX3KM, T26FIC, 9Q5NW, 1800 CX, LU, OY8JD, PY, W1-W5, ZP5PX, 5L1AH, 9H1EL, 1900 CX6JV, PY2ZK, ZD8MAC, 2000 CE3ZW, FM4EB, V44KO, ZP6VT, 4U1ITU, 2100 EA6OK, J37ZY, K4JAG, 2200 EA9IB, FM5DX, JY9RL, KS3S, PJ2WG, 9Y4GR, 2300 FM5BX, HC1OD, HH2MC, KP4AXC, VD1ASC, WP2ABB, YS1ZR.

Thanks are also due to the following for items extorted: *The Ex-G-Rudin Chrb Bulletin* (G13DEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), the *DX Family Newspaper* (JH1KRC), *DXpress* (PA3CXC), *CQ Magazine* (W1WY), *DVNI* (DL3RK), *Long Island DX Bulletin* (W21YX), *DX News Sheet* (G4DYO) and *DX Report* (VK9NS).

The closing date for receipt of material for the November issue is 24 September.

## VHF/UHF Ken Willis, G8VR\*

IF A HISTORY of the 50MHz band is ever written, then surely June 1987 will merit a chapter in its own right. On some days in the month, propagation conditions existed which almost defy description, surpassing anything previously experienced on the band. When one adds to this the fact that the band had just been released to all UK amateurs, the result was intense activity, with hundreds of stations making transatlantic and Caribbean contacts using just a few watts and simple antennas, often no more than a dipole. It was a surprise to find so many amateurs equipped and ready to use the band right from the date of its release. Many newcomers may have gained the impression that 50MHz is always like this, but the "few" who have monitored it for years will confirm that they were taken by surprise at the sheer scope of the openings compared with anything which had occurred before. It may be years before similar conditions return, so although the events have been widely reported in the radio press and over GB2RS newscasts, a summary is justified for record purposes.

A summary of the main openings provided by Ray Cracknell, G2AHU, is as follows:

7 June	1350-1410	G to W4, VE1 LA6QBA to W4
7/8 June	2350-0830	G to W1
13 June	2100-2135	GJ to W3, W4
13/14 June	2200-0100	CT4KO to KO
14 June	1450-1530	GJ to W4
	1457-1520	W6JKV/V2A working G
	1550-1621	D-W4
15 June	1930-2015	N4HSM/V2A working G
	1645-1810	GJ-W5
17 June	2116-2323	G-W1, W4, W5, VE1
	2109	OH-VE1
	2157-2220	OH-W1
18 June	1835-2115	G-W1, W2, W4, VE1
	2039-2042	OX3VHF copied in G
19 June	1755-2030	G, GM, GD, GJ, GI, EI to W1, W2, W3, W4, VE1, VE3
		CT, D, PA to W1
	1924	OH to VE1
	1941	OH to W1
	2044-2207	OX3VHF copied in OH
	2235	Aurora in LA, SM, OH
24 June	1710-1910	W6JKV/YVO working G (Aves Island)

The assumption is that this was some form of sporadic-E propagation, but a glance at the coverage illustrates how far the main events depart from our conventional views of such events, even when multi-hop sporadic-E propagation is assumed. Jeff, G3ENY, commented that propagation embraced an area from the east coast of the UK right across to Cornwall, and from the south of England to Scotland, repeated on the far side of the Atlantic by a similar coverage area. It was in fact even greater than this, since Jan, OH1ZAA, was able to participate in at least some of the action, and

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although not listed above, 9HICG confirmed over the air that USA contacts had been made by Maltese stations. The appearance of W63KV, first in Antigua and then in Aves Island, provided, thrilling contacts for numerous British stations. His trip to Aves Island, YV0, was primarily intended, I understand, to provide a new country for the American 50MHz fraternity, but the relative unpopularity of the band in the USA was shown by the fact that in his single day of operation from the island, he worked over 100 Gs and only about 50 USA stations. Incidentally, G4JE reminded us that although Aves Island is Venezuelan territory, it counts as North America for award purposes due to its distance north from the South American mainland.

So what can be said about the nature of this incredible propagation? Even today, there are highly qualified professional observers who refuse to accept that these things are possible, even to the extent that they believe amateurs "imagine" or concoct these events for their own purposes. Ray Cracknell, G2AHU, faced similar attitudes in the 'fifties when his top experiments were breaking new ground. We know what is happening, and are well aware that current theories are inadequate to explain the observed data. At this stage we can only guess at the causes while enjoying their effects. Ray comments: "We are now at a minimum of magnetic disturbance, and magnetic disturbances disrupt temperate zone sporadic-E, hence E<sub>r</sub> conditions are best at sunset minimum. We know propagation takes place. The ionosphere is obviously responsible, but we can only attribute it to sporadic-E." This is interesting, since sporadic-E has always tended to be associated with such phenomena as shear winds and the like, and any suggestion that this form of propagation is related to solar activity has been disavowed. But in the GB2RS newscast for 12 July, Charlie Newton's solar forecast reported: "The active side of the sun will be facing the earth this week and, using past rotations as a guide, there could well be some more transatlantic openings at 50MHz." Since these notes are being written literally at "zero hour" (10 July), any recurrence of abnormal propagation in the coming week could certainly support the view that, sporadic-E or not, the sun is playing a vital role in these widespread events.

Commenting on GM4HH's views on multiple-hop Es (VHF/UHF) May 1987) Jan, OH1ZAA, says that reflection of a horizontally polarised wave from the surface of the sea is virtually loss-less, so it makes little difference whether reflection or grazing incidence occurs at the mid-point of the path. Ray, G2AHU, does not wholly agree with this, since it holds only if the sea is dead calm or the wavelength of the radio wave is long compared with the sea-wave interval. Otherwise, a good deal of back-scattering takes place, which Ray has observed not only on transatlantic paths but also on paths to the Mediterranean and South Atlantic.

Some confusion has arisen due to the current regulations which do not require an amateur in the USA to change his call if he moves from one call area to another. Hence a W5 or W6 may be operating in the W1 or V2 call area, still signing with his original call. This has led to some stations claiming to have worked deeper into the USA than was the case. However, some real penetration did occur over the weekend of 13-15 June, during the ARRL VHF QSO Party. G4ICD was enjoying stations in the W4, 5 and 7 call areas on 50MHz but was unable to make contact due to locals "hogging" the dx calling channel. The opening lasted some four hours, and as a result of this experience WA1OUB has written to ARRL requesting that a "dx only" window be established during vhf contest periods, extending from 50-100 to 50-125MHz. By the way, G3ENY tells me that an oscillator in American colour tv sets produces a nasty "birdie" on 50-114MHz, so avoid this frequency in calling any W stations. If WA1OUB was a strong signal with you, one reason is that he runs over 1kW into an 11-element Yagi on 50MHz! Compare that with those British stations who worked the USA with 5W to a dipole. A more recent station to come in to 50MHz is CT3DX (Marleira) which is treated as Africa for awards purposes. During the 19 June event, G4JE made 36 transatlantic contacts and all-time has now worked 15 USA states on 50MHz.

Further major 50MHz openings occurred on 17 and 21 July.

### Beacon notes

The 50MHz beacon planned for Malta, which G4JE has been working on, is in the hands of GW3LDH who is to arrange for its despatch, so hopefully it will be on the air before the end of the summer.

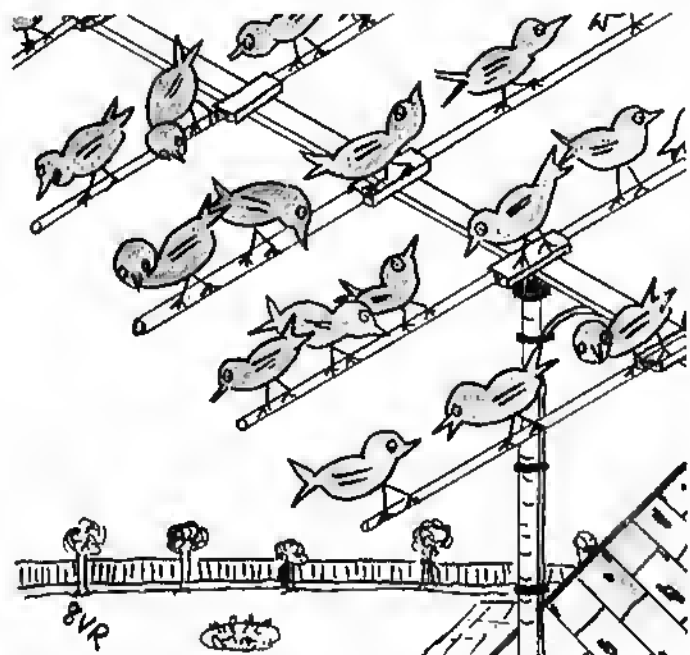
CT0WW, the Portuguese beacon set up by Tiago, CT1WW, has been putting good signals into the UK on 50-030MHz from location 1N61GE. As well as indicating E<sub>r</sub> conditions, it pings away erratically via meteor scatter. Jan, OH1ZAA, found it unexpectedly when tuning across the band on 20 June, the day it came into service. John Wilson, G3UUT, says that the transmitter is a much-modified commercial unit running 40W into a dipole. Tiago hopes to move it to a better location and to install further vhf beacons at the same site.

The beacon transmitter being built by OH1ZAA, which he had hoped to operate from Finland, is—as mentioned last month—now destined for

Grand Cayman in the Caribbean. The beacon-keeper will probably be Roger, ZK1RC, but Jan will keep his own reciprocal call (ZK2KZ) as the beacon callsign. Location should be EK99HG. Jan now has it working in breadboard form, delivering 12W on 50-092MHz. In his letter, Jan also said that on 19 June, during the big opening on 50MHz, as the USA signals started to decline, beacon OX3VHF started to be heard strongly, eventually reaching strength seven. GB3RMK was also heard, with slight auroral tone, while on 144MHz beacon SM3VHG (144-890MHz) was copied for two hours via auroral-E. Whether these events relate to the remarkable conditions which prevailed on 50MHz that day, only time and further experience will tell.

The Canadian beacon, VE1SIX, which was on 50-088MHz, was QRT at the time of writing due to a lightning strike which caused serious damage to the equipment.

Beacon FY7TIF (50-039MHz) was copied in the UK on 18 June by G4JE and others around 2134gmt towards the end of one of the big USA/UK openings. It is a good one to listen for if you are interested in propagation in this band. Another would be PY2AA (50-062MHz), and don't forget that SZ2DH is assumed to be QRV on 50-015MHz since G4UPS heard it while operating portable in France.



"Until he changed that dipole for this Yagi, we never had the room to invite all my wife's relatives to stay"

### Square bashing

How are you doing chasing new squares? The current issue of *QEX* lists the leader of 144MHz as Y22ME, with a total of 630 worked! The nearest G station is G3POI with 433, though Clive has a rather special antenna system which has enabled him to work a lot of rare ones using moonbounce. The list illustrates the advantages of living in the centre of a land-mass rather than on an island surrounded by "wet" squares. Several of the Russian stations have totals above 300, while some of the meteor scatter "regulars" feature high in the list, showing how this mode can be very useful in winking out specific needed squares.

On 432MHz, top place is shared by SM3AKW and DL7ZL, with 226 squares worked, the highest G being Jan, G3SEK, with 165. However, the tables tend to be very fluid and may have already changed a lot by the time you read this. Two USA amateurs, K1FO and W1JR, both from New England, appear in the 432MHz listing, indicating the interest in square-chasing in the USA these days.

### 70MHz from Portugal

Although the amateur population in Portugal is not large, we are fortunate that there are some very keen vhf operators there to provide contacts with that country on our most popular vhf bands. Tiago, CT1WW, would like to activate 70MHz from his country, and to this end is seeking to purchase a second-hand Microwave Modules transverter 28/70MHz. If anyone has one to offer, or any information which might lead to one being located, perhaps they would be good enough to contact John Wilson, G3UUT, QTHR (tel 0223 843546), or by getting in touch directly with Tiago.



## From here and there

Paul Thomson, G6MEN, recently operated from France signing F/G6MEN, and came back with some useful information for those who "collect" French "department" numbers (rather like the popular WAB numbers game here). He was told that on 144MHz, local "natter" nets foregather on frequencies determined by the number of the department, so during the evenings you may hear operators from Finistere (Dept 29) on 144.329MHz, or from Loire et Cher (Dept 41) on 144.341MHz. My French callbook lists 95 separate departments, so the number appears to fit the scheme nicely, but only if you ignore the fact that there are beacons on the band which some of us still listen for! Perhaps I will be persuaded to offer a hottle of best plonk to the first station who works them all. I think I would be on a safe bet because getting the necessary QSL cards out of French amateurs can be a tedious business, as many of us have learned by bitter experience. Incidentally the French callbook has one distinct advantage over ours; it lists amateurs by department as well as numerically/alphabetically, so if you want to work someone in a given location, you can look up the list and see how many licensed operators are in the area.

Two stations, GW4FRX and G0DAZ, reported hearing Arabic being spoken on 144MHz on 7 and 11 June, during sporadic-E conditions. Colin tried QRZ and received back a callsign which he feels sure was 5AICD, though no more was heard. A local station, G0CUZ heard the exchange and generally confirms the call given. Since 9H11 stations were coming through at the time, one could be permitted to assume that the call might just have been 9HICD, not 5AICD, but Colin does not think so, nor does there seem to be any reason why our friend Henry, 9HICD, should be speaking Arabic. If he was, perhaps he will tell us eventually. If, however, it means that there is amateur vhf activity in Libya, this is good news since it would be within range of the UK under favourable E conditions and represents a new country to be worked in North Africa. If anyone has any further information, please let me know so that I can pass it on.

In the June issue, G0DUS commented on the fact that he was unable to obtain information on the Newbold Association Target Sports Award, sponsored in 1985 by Rugby ARS. Having applied for this award, and sent the prescribed fee, he says he heard nothing more. On reading this, Kevin Marriott, the Rugby ARS secretary, wrote to say that unfortunately the project had to be postponed indefinitely but, as far as he knew, none of the cheques sent were presented for payment, while other monies received were returned to the senders. Anyone requiring further information should contact G6ZZE, QTHIR, or telephone 0533 866878. Thanks to Rugby ARS for their prompt response.

Allan Duncan, GM4ZUK (Aberdeen), did not think much of the advice in the June News Bulletin which referred to "centres of activity" rather than calling channels on 50MHz, and stated that "You don't necessarily need to move off... if you've called CQ and received a reply". He regards this as "terrible advice, just as it would be on 144MHz. Recently, two stations adhering to this suggestion completely blocked the "calling channel" and prevented Allan from making contacts to the south on ground wave. He found it impossible to break in on them, since the low erp restrictions on 50MHz combined with the distances involved meant that the high signal strengths between local stations swamped his own calls. However, it must be said that the intention behind these so-called "centres of activity" is to encourage operators to call "CQ" in a general area, rather than on a specific frequency since, where there is high activity, stations often block one another's calls by transmitting at the same time on the same frequency. Searching a somewhat wider area for such calls ought to work, but first operators must abandon the slavish use of "calling channels" for CQ or other calls. I suspect that many of us feel that if we do this, no-one will be listening. Footnote: today I called CQ on 50.201MHz, and commenced a QSO, only to be chided by the other station that "we should QSY off the calling channel, you know, old man!"

Anyway, GM4ZUK feels that in common with other GMs, not to mention GW and GI stations, "QSY on reply" should be mandatory.

In the middle of the excitement on 50MHz, the first-stage transistor in the transceiver at G8VR decided that its last hour had come. The sudden loss of signals caused a great depression to settle over Broadstairs, especially when I lifted the lid on the rig to find that only a very small and highly-trained beetle would be able to get in close enough to effect a replacement, quite apart from the impossibility of finding an equivalent of the fiendish Japanese device within 500 miles of JO01RJ. In desperation, and the expectation of losing the rig for weeks while it was repaired, I made a trip to London, to the premises of ARE Communications Ltd. Here I met Martin, G4HKS, of that company, who, having clearly encountered this situation more than once, wasted no time in arranging for things to be put right so that, to my great relief, GB3NHQ and other dx signals once more issued from the speaker. Many thanks to all concerned at ARE Communications Ltd for the prompt service. As a "valve" man, I can only marvel at the way they can dig these tiny devices

out of pcb boards, let alone put in another one. Let's hope they don't make rigs any smaller. I can hardly get my fingers on all the buttons and knobs as it is!

## Repeater news

Brett Laniosh, G4NZK, who is secretary of the newly-formed Midland Amateur Repeater Group, sent a copy of the group's first newsletter. They are responsible for GB3AM (Longbridge, R6), BM (Dudley, R3), CB (Birmingham City, RB14) and TH (Tamworth, RB13). A proposal is being drawn up for a 1.3GHz Birmingham repeater, and another of the group's interests is the 28MHz repeater project announced some time ago in *Rud Com*. They would welcome technical assistance on this project, addressed either to Brett, G4NZK, or Bob, G1BCZ, both QTHIR. GB3AM has been off the air for servicing but should be back now, but both TH and CB were due for engineering work requiring them to close down for a while. GB3BM is scheduled to be fitted with CTCSS to allow users with easily-modified rigs to use specific user slots on the system without having to listen to other QSOs in progress. Details will be given in a later issue of the newsletter, and in addition, group members will be planning talks describing the system to clubs or other groups in the general Midlands area. New members of the group would be welcomed. Write to G4NZK or G1BCZ.

Central Scotland FM Group's *FM News*, summer edition, is also to hand with its usual wealth of information, technical and topical, indicating that the health of this group continues to be good (it would need to be in that climate!). The group is hoping to read the GB2RS newscasts over repeater GB3HI (Island of Mull, R4), the news being read on the input instead of having a reader on site which was originally stipulated by the licensing authority. Approval for this is awaited, and if granted should provide a valuable service in a mountainous, sparsely populated area. Another innovative project being considered by the group is the linking together of two under-utilised 432MHz repeaters by means of a sub-audible tone control system to provide "two repeaters in one" to increase substantially the effective coverage area. The repeaters chosen are GB3AB (Aberdeen) and BA (Banchory), with AS and EV the next in line to be considered if it all works out well. If that were not enough, the group is awaiting approval from the RMG to conduct a fixed-time experiment to turn the Dumfries & Galloway repeater, GB3DG, into Britain's first "X" channel repeater; that is, a full 25kHz specification system but interleaved between two of the current repeater channels. By the time this is read the decision should have been made, one way or the other. The new secretary of the group is Ken Glendinning, GM4EZJ, who took over from Bruce McCartney, GM4BDJ.

From France, Eric F8ZF (Vence), says that his friend F6GIZ has established a packet radio repeater some 900m asl in his vicinity, with another awaiting approval, located at a high spot which would allow coverage to the Nîmes/Avignon region and onwards to Paris. Anyone wanting further information, please contact F8ZF, Clos de Camassade, Tourette sur Loup, 06140, Vence.

## Harold Rose, G4JLH

With much regret I learned over the air from Steve, G4JCC, that Harold Rose, G4JLH, one of the founder members of the 6 Metre Group and its first chairman, died on 19 June aged 35. His enthusiasm and work on behalf of the group contributed much to its success, and he will be greatly missed. He was active on his favourite band from Wootton Bridge, Isle of Wight, until a few days before his death, and was no doubt delighted to witness some of the remarkable events on 50MHz following its general release to UK amateurs. There can be little doubt that the work of the 6-Metre Group contributed significantly to the decision by the licensing authority to make an allocation to amateurs in this part of the spectrum.

## Meteor scatter

At the IARU Region 1 Conference last April, the "OIIIZAA system" for random-channel ms working was approved, and it is recommended that it be adopted forthwith. As described in *VHF/UHF* for October 1986, a random channel CQ call should include a letter which signifies the frequency on which the caller will listen for replies; for example, "CQD G8VR" would mean that G8VR will listen 4kHz higher than his transmitting frequency, D being the fourth letter in the alphabet. Another proposal adopted was for a reduction in cw ms periods from 5 to 2.5min, and this also applies to random calls.

Gerald, G4OIG, who is a cw ms enthusiast, is concerned that problems may arise from the fact that the current band plan places the cw random frequency (50-300MHz) right in the middle of the ssh section of the band. He feels that it would be more logical to move it up somewhere like 50-450MHz, especially as the occupancy of the band is now increasing rapidly. He disputes the view that the longer reflections on this lower frequency band make the use



of high-speed cw unnecessary, pointing out that for stations towards the middle of the country, the distance between them and Scottish or Northern Ireland stations is really too short for good reflections, justifying the use of cw rather than ssh. I can sympathise with this view, for in a recent ssh ms contact with Allan, GM4ZUK, even from my southern location it took nearly an hour to complete on ssh, since bursts were not long or strong enough to provide the required information, whereas high speed cw would have finished it off very quickly.

Another operator hooked on ms cw is Colin Mister, G0DAZ, who had 12 contacts on 144MHz by this mode between 3 and 20 June. He is unusual in that he uses the random channel quite regularly instead of schedules, and in this way "grabbed" SM6AFH/TF after unsuccessfully trying to arrange a sked with him on the vhf net. He also completed with the 4U1TU expedition station in 16min.

## 50MHz allocations

With so many prefixes appearing on 50MHz these days, one is not always sure of the authenticity of some of the European stations heard, since not too many countries have announced the release of facilities on the band. Apart from the UK, it was reported earlier that Malta has given amateurs the band 50-52MHz with a power output (not erp) of 10W, as reported by Paul, 9H1BT recently. Norway has changed its regulations to allow 24h operation instead of the "after tv" hours but with an erp of only 50W, which is low by any standards. Greenland and Iceland apparently permit 50MHz operation, and the expedition group in Cyprus signing ZC4VHF/5B4 operated on the band successfully during June. At the moment it is not known whether this was a "one-off" allocation or one which will be on a permanent basis for both ZC4 and 5B4-prefixed stations. Gibraltar has long permitted 50MHz operation, but my information is that Spain does not, despite the fact that one or two stations regularly appear on the band from that country claiming to have "local" permission to operate. Portugal is understood to have issued a limited number of permits, about six in all.

# THE RSGB 50MHz REPORTING CLUB

Ray Cracknell, G2AHU, club co-ordinator

## 50MHz records

The RSGB VHF Committee has decided that records should be kept for 50MHz as they are for other vhf and uhf bands. For this purpose 50MHz had to be considered as a special case. It covers frequencies where mode confusion is very likely to occur, variations through the solar cycle are profound and in IARU Region 1, television still occupies the band in most countries with the result that many countries in Europe can only be worked crossband.

It was therefore decided first to establish British records, and then to liaise with the Region 1 record co-ordinator with a view to establishing 50MHz records applicable to the region as a whole.

## General conditions to be applied to British 50MHz records

- There should be two sections to each record:
  - Two-way QSO between stations each operating in their allocated section of the 50-54MHz band.
  - Crossband provided that one transmission took place within the 50MHz band and the other used a frequency above 28,000kHz.
- Records will apply to any 50MHz contacts since the band was first allocated in 1946.
- All records will have to be verified according to a procedure approved by the RSGB VHF Committee.
- To break a record, any existing recorded distance must be exceeded by more than the maximum error in calculation. Within the limits of error, a record might be declared to be equalled.
- An IARU-approved computer program must be used to calculate any claimed record distance.
- To qualify for a record, a complete QSO must take place. In addition, to qualify for a two-way record, communications must be established on 50MHz. If another band is used in any way then only crossband records could be recognized.

## Records that may be established

### 1. Maximum distance

This will apply to any mode worked from Britain provided that:

- There is no artificial medium (eg satellite or repeater).

It is understood that amateur organisations in both France and Germany have made application for 50MHz allocations, so far without success, and at the recent Region 1 IARU Conference in Holland, several countries expressed an interest in establishing beacons on the band and sought help from the RSGB in the administrative procedures involved. Outside Europe of course, several countries have long permitted 50MHz operation, but contacts with these will presumably become less frequent as sporadic-E conditions decline, since it will be a few years before much F2 propagation can be expected. I will be quite happy to be proved wrong in this, by the way! What could not have been foreseen, I suspect, is the tremendous growth in crossband activity, which has greatly increased the number and variety of prefixes to be worked from the UK. Overseas stations can be heard on 28MHz claiming the new squares and countries they have worked crossband, so the enthusiasm appears to be a two-way thing even if the contacts are split-frequency. Thanks are due to those who took the trouble to build 50MHz receivers and antennas, and are prepared to listen through heavy local television signals to copy our signals.

## Aurora

At this point in the solar cycle, auroras—at least in more southern latitudes—are rare, but Ron Livesey the director of the aurora section of the BAA still sends me reports from his colleagues who make visual observations on a regular basis. He comments: "Not much is happening, aurora-wise, although there are odd sunspots of the new cycle building up. The magnetic field is relatively quiet and it remains to be seen what radio operators find". With the relationship between amateur astronomers and radio amateurs now established in this area, any reports will supplement Ron's visual data; so please let me have any information relating to auroral activity, however brief, so that it can be passed on. This is of course applies very much to the more northerly stations, but as far south as southern France (Vence). F8ZLF France is proposing to build a "Janjar magnetometer" despite the fact that the last really major auroral event with him was 26/27 January 1939! □

- The distance be measured by the shortest great circle distance between stations claiming the record.
- The location of any portable or mobile station can be verified.

## 2. Maximum distance worked at sunspot minimum

The same conditions as for the maximum distance record will apply to this record, with the addition that the QSO must have taken place during the period of 12 months either side of the month of the official minimum once this has been established.

## 3. Maximum distance within the British Isles

This record is applicable to the whole of the British Isles including Ireland, the Channel Islands and all other islands recognised as part of the British Isles. Expeditions are to be encouraged and will be recognised for this record.

## 4. Maximum distance by aurora

The distance for this record will be the great circle distance between stations, and there will be two sections:

- Normal aurora working with beams directed at the reflecting medium.
- Auroral Es for distances significantly greater than possible by normal aurora with beams more or less direct during proven aurora conditions.

## 5. Maximum distance by meteor scatter

This record is applicable for one-hop ms propagation only, and is not applicable to ms extensions from other modes. Full call signs and reports must be exchanged.

## Procedure for claiming or reporting a record

- The 50MHz Reporting Club is responsible for the administration and the keeping of records.
- Any amateur may claim a record or report that a record has been broken or a "notable first" has taken place.
- In addition to records, "notable firsts" will also be recorded. For example, the first transatlantic 50MHz QSO between G6DII and W1HDQ is a "notable first", others remain to be recorded, while some like Britain to Australia and New Zealand should provoke keen competition during the rising sunspot cycle as only crossband contacts have so far been worked.
- Claims and reports should be sent to 50MHz Reporting Club co-ordinator: R G Cracknell, G2AHU, 18 Green Lane Crescent, Yarpole, Leominster, Herefordshire HR6 0BQ. Old-timers in particular are requested to supply relevant information, and a volunteer willing to research back copies of magazines would be particularly welcomed. □

# SWL

Bob Treacher, BRS32525\*

## Sporadic-E

The "E" season came a little early this year, with openings on 144MHz on 28 May. I am very pleased that there was also an opening—indeed two openings—on 7 June, as I had suggested in the June column that one might occur. As these openings have already had some coverage in the magazine, I will not dwell on them for too long. However, it is worth recording that the 7 June Ex in London started at 1225 with 18, 10, 1C8 and 1T9, and ended at 1253. In the evening, a second phase brought in several YUs and the first LZs heard at this QTH. LZ2AR and LZ1KDP were audible here for 14 min. In Yorkshire, David Whitaker, BRS25429, caught the second phase—but at 1700, and only for a few minutes—bringing in several YUs. Since this opening, Ex was noticed on 16–19 June, but unfortunately I missed them all!

An opening of only 15s occurred at 1654 on 30 June, when an Italian was heard in QSO with another Italian on 144.275MHz. No call sign was copied. At the time, pictures could be seen from RAI on Band 1 (Channel E4) on my new toy! This "opening" on 144MHz was somewhat surprising because the pictures on Band 1 were not particularly good, but it proves how quickly Ex can strike, and also how valuable a Band 1 tv can be.

Looking also at 50MHz sporadic-E, I caught openings on 23 and 25 May to EA, 28 May to GM, 6 June to 9111, 7 June to 9111 and CT1, and 8 and 11 June to 9111. Unfortunately, all the transatlantic Ex had been missed at my QTH at the time of writing.

While on the subject of 50MHz, GM3WOJ is the beacon keeper for GB3RMK (1077UO, 6km north of Inverness). He would appreciate swl reports on the beacon's signals on 50-060MHz. It had been copied all round Europe during June via sporadic-E, and some interesting reports had been received. It is running 40W into a folded dipole, 240m above sea level. In anticipation of receiving more reports, QSL cards have been produced.

## TV dx

I mentioned briefly my acquisition of a Band 1 tv. Although I did not purchase the set from them, Aerial Techniques of 11 Kent Road, Parkstone, Poole, Dorset BH12 2EH, are suppliers of all manner of tv dx equipment. They have a new and very comprehensive catalogue which is available for 75p. Why not send for one and delve into the world of tv dxing? Many swls are interested in this form of dxing and gain much pleasure from watching dx instead of listening to it.

## WWV and WWVH

Most listeners and amateurs are aware that the USA National Bureau of Standards (NBS) hf radio stations, WWV located at Boulder, Colorado, and WWVH located at Kurei, Hawaii, broadcast standard time in gmt (utc). In addition, WWV also broadcasts geophysical alerts which contain information about propagation. NBS broadcasts continuous signals from WWV and WWVH on 2.5, 5, 10 and 15MHz. WWV also broadcasts on 20MHz.

QRZ DX recently carried more details about the service which are worth repeating here. Voice time announcements are broadcast from WWV and WWVH once every minute. A male voice gives the detail on WWV, while a female voice gives the gen on WWVH. The WWVH announcement occurs first, at 15s before the minute. The WWV announcement occurs 7.5s before the minute. But the time time markers from both stations occur simultaneously. The time announcement refers to co-ordinated universal time (UTC) and is equivalent to gmt.

Current geophysical alerts are broadcast from WWV only and at 18min past each hour. These are alerts; not radio propagation forecasts, which were discontinued 11 years ago. The announcement messages are changed approximately every 3h at 0600, 0300, 0600, 0900 etc. The alerts contain these details: solar-terrestrial indices for the day, the estimated "A" value for Friedricksburg, Virginia, the current Boulder, Colorado, "K" index and the forecast for the next 24h. This is the information we see credited to KH6 BZF in his propagation reports.

Other announcements broadcast via WWV and WWVH are not generally of use to the amateur, but listeners may wish to know that the Omega navigation system status report announcement is broadcast from WWV at 16min past the hour (and WWVH at 47min past the hour). Marine storm warnings are broadcast from WWV at 8, 9 and 10min after the hour (and from WWVH at 48, 49, 50 and 51min past the hour).

For those who wish to hear the news direct, you can dial direct to WWV by

\*93 Eltham Road, Eltham, London SE9 1UJ.

telephoning 0101 303 499 7111 for the time announcements, and 0101 303 497 3235 for the geophysical alerts. The cost at off-peak times is 50p plus VAT for 1min.

## VHF awards

Jack Hunt, G5UM, has done some delving and provided me with details of those listeners who have claimed the various listener awards available from the Society for achievements above 30MHz.

As most listeners will know by now, both the Squares Award and the FMD Award are available. Over the years many swls have claimed the various classes of award. By way of recognising the feats of some, and as an incentive to others, here are details of some notable lists and latests.

### 70MHz Squares Award. No claims

#### 144MHz Squares Award.

40+10: no1 BRS41733 20.11.81  
no256 BRS31976  
no272 FE8957 8.11.86  
60+15: no18 BRS31976 9.6.86  
80+18: no88 BRS31976 1.11.86  
100+20: no88 BRS31976 22.2.87  
125+20: no19 BRS25429 13.6.85  
150+20: no12 BRS32525 6.8.85

#### 432MHz Squares Award.

30+6: no63 BRS32525 11.3.87  
40+10: no29 BRS25429 10.6.85

#### 70MHz FMD.

No1 Ron Ham, BRS15744 1.2.86  
No2 Ron Thomas, BRS15822, 20.2.69  
No3 Malcolm Poper, BRS 32036, 20.6.71  
No4 Will Hodgkinson, BRS24450, 25.9.71  
No5 Harold Meerza, BRS34348, 10.6.75  
No6 George Giezbeniak, BRS41733, 26.4.81

144MHz FMD. 40 certificates have been issued. The first was to Des Dryborough, now well known as G3NNG. The latest is Mick Toms, BRS31976, on 6.11.86.

144MHz FMD Senior: BRS15744 claimed No1 in February 1986. David Whiteaker, BRS25429, has the latest, no6

432MHz FMD: BRS15744 managed No1 on 8.6.85. No10 is the latest, which is in my shack.

432MHz FMD Senior: No1 BRS34348, 9.11.75. No2 BRS25429, 10.8.85.

Both G5UM and myself hope that the foregoing will stimulate listeners to look through their vhf QSLs to see if they have sufficient confirmations to claim any of the awards, while others listed here may even have further confirmations to enable them to claim a higher class of award. For full details of the Society's vhf award programme, send a large sac to G5UM, QTHIR.

## QRP

Phil Le Brun, now G0111N, wrote regarding the type of news he wants from swls in order that he can write his swl column in *Sprat*. He will be grateful to receive listening tips, ideas for better short-wave reception, and details of QRP stations heard. Phil's address is 22 Russet Road, Cheltenham, Gloucestershire GL51 7LW.

## Round-up

To conclude, some news from here and there. Mick Toms, BRS31976, caught OY9JD (IP62) on 24 May on 144MHz, along with some GMs, including GM8PNP on the Shetlands. Mick had returned from a business trip to VK, depressed at the cost of rigs down under compared to the exorbitant prices we have to pay here.

G4YDM is collecting used stamps to finance the purchase of a secondhand transceiver for a disabled amateur. If any swl has a store of used stamps, he would be grateful if they could be sent to him at 30 Manor Park, Concord Village—District 11, Washington, Tyne and Wear NE37 2BT.

Dean Allison, BRS88384, wrote for the first time. He uses an SRX30D receiver into a 132ft long wire. Some good catches had been entered into Dean's log, including S79CW, 9Y1WP and 9M2CS. OB21B is obviously a mislogging.

Brad Bradbury, BRS1066, had carried out a 28MHz project for G3BFR and heard 49 countries during the period, including Heard All Continents! VK9NL provided the Pacific contact. Somewhat surprisingly, Brad had actually logged some of the contacts on SSB!

## Finale

That's all for another month. News, views and table scores for inclusion in the November column should reach your scribe by 15 September. □

# MICROWAVES

Mike Dixon, G3PFR\*

## Operating news and views

I am sad to report that the microwave assembly and dinner, organised by Frederick, G6FK, which was to have taken place on 18 July at the Wolverhampton Race Course Suite, has had to be cancelled due to lack of support. Why this drastic step was necessary is unclear, since most of those who attended last year's excellent meeting had made an immediate provisional booking for this year's event, which had promised to be even bigger and better than last year's "do". Perhaps it is because the date is at the beginning of the "high season" for summer holidays, or perhaps it is due to other factors.

Frederick mentioned that many of his regular, almost daily contacts on 1-3GHz, have (it is hoped temporarily) disappeared onto either 50 or 70MHz, to the general detriment of the microwave "scene as seen" from the Midlands! I must admit that it is easier for the less-skilled operator/constructor to go out and buy a "black box" or even build one of the excellent transverter designs which have been published recently, than it is for the 1-3 or 2-3GHz bands. Although "black boxes" are available for these and other bands, they are not as cost effective as the lower bands when it comes to activity and actually making contacts! Individual components are also less easy to obtain, despite the efforts of the components service.

Also, what happened to entries for the constructional contest, sponsored via the *Microwave Newsletter*? As far as I know at the time of writing (early July), the Microwave Committee has yet to receive any entries at all! Support for the 2-4GHz band has also been poor, despite many key components being available via that service. Where have all the "real" amateurs gone?

Harking back a couple of months, I mentioned a new 1-3GHz beacon in Vienna as being on "UK territory"—this, of course, should have read "UN—United Nations—territory".

Sam, G4DDK, sent in a note of his impressions of the conditions during the May contest. He describes them as "not very special" as seen from the east coast. He worked PA4ALK, PA0WWM, PA4KML, PE0ALA, PE1JZL, PA0RDY, PA3ADU, PA0HVA (all JO22, CM), PA4VAD and PE0MAR/P (JO21, CL). A morning lift, with its characteristic rapid QSB, allowed him to work PA0NZH, PE1DYC in JO21 (CL), DL1EBR in JO31 (DL) and many G stations. Sam said that conditions were similar on 2-3GHz, working PA0WWM, PA0RDY, PA3ADU, PA0PLY, PA4ALK, PE1ALA and PA0EZ (all JO22, CM) and PA0MAR/P in JO21 (CL), all at good strength. His equipment on 2-3GHz comprised a 44-element loop-quad with 2W and an OE9PMJ MG1 202 preamp. Sam further reported that conditions in the May 1-3GHz Trophy contest were very poor, only 25 stations being worked in the eight hours of the contest, with PA0WWM (JO22, CM) and FC1DNB/P (JO00, AK1) as his best contacts, the majority being inter-G.

## Microwave feedback—band plans

In the complete absence of any further news on the operating front, I feel it may be appropriate to expand a little further on the question of band plans and band planning—again!

One or two minor inaccuracies seem to have gone unnoticed in the plans published in the July *News Bulletin*. Notably there are some odd placings of the usage comments against the frequency sub-bands.

For instance, in the 1-3GHz band plan, the repeater outputs are given as 1,297-000 to 1,297-475MHz (RM0 to RM19) with RM0 shown, ambiguously, as "1,297-000 fm centre of activity". RM0 output is, of course 1,297-000MHz.

Two further areas of the band have been set aside for repeaters: R (M?) 20 to 36, in which the inputs are 35MHz above the outputs, with inputs at 1,293-150 to 1,294-350MHz and outputs at 1,258-150 to 1,259-350MHz. I wonder whether this will lead to another situation, as on 432MHz, where the UK standards are tighter than, and different from, those on continental Europe? Our standard is, of course, 6MHz separation, with inputs below the outputs—a policy formed many years ago to allow repeaters to act as beacons, with their outputs just above the international beacon band.

Perhaps the reader can begin to comprehend the difficulties in band planning which arise from different standards, practices and allocations in a continental area which has otherwise "common" aims!

Moving to the other band plans, note that the cw/ssb "centre of activity" is given as 200kHz above the bottom of the international narrowband sub-sections at 1-3, 2-3, 10 and 24GHz. I note with curiosity that 250kHz

seems to have crept into the 3-4 and 5-7GHz bands as "preferred", and believe this to be either a misprint or a mis-interpretation of the intent: again it has been established practice for a long time to use "point two" as a focus for narrowband activity and is likely to remain so.

At 10GHz, note that where 10-368 to 10-370GHz is not available, 10-450 to 10-452GHz is suggested as an alternative. This, of course, is in the satellite band and therefore may be disputed by some (eg Amsat). However, 50MHz cannot be left fallow, awaiting space experiments in late-phase satellites, and in any case, the possibility of ground/space or space/ground mutual interference is exceedingly low, particularly in view of the very narrow beamwidths employed in this band.

In the 24GHz band plan, again the usage column is misleading: the satellite band is shown as 24-000 to 24-050GHz in the frequency column, with the remark in the usage column that the "preferred operating frequency for wide-band equipment" is 24-125GHz. Again, for a long time in the UK (particularly since it is free from operating-site restrictions) 24-025GHz has been the focus of such activity and is certain to remain so.

Which brings me round to the subject of band planning for the UK in general! One of the major tasks facing the Microwave Committee in the next six months or so, is to undertake detailed band planning within these broad-brush Region 1 plans. It may be necessary to impinge on the satellite band at 2-4GHz, for instance, in order to provide suitable channel separation for terrestrial wideband (tv and possibly digital tv) repeaters and duplex working. Again, I feel it is a little incongruous to allow 50MHz of this band (already subject to interference from domestic microwave cookers!) to lie, unused, until such time that satellites carrying transponders (as distinct from simple beacons) might become reality. That, as far as I can see, is still some years away.

However, the Microwave Committee would welcome constructive comments and feedback from all current user (and potential user) groups before proceeding with such considerations. It is important that decisions are taken in the next six months so that a strong case can be argued for our continued use of designated frequencies and sub-bands in the face of increasing pressure from the primary users of the bands. Given timely input (as soon as possible, please, via HQ—or direct to me) and "proper" planning arising from this, I feel certain that the primary users (them!) and secondary users (us!) can co-exist without any insuperable problems either way. □

## QRP

Rev George Dobbs, G3RJV\*

## QRP on show

For the first time, this April the G QRP Club took an exhibition stand to the Hamvention in Dayton, Ohio, the biggest amateur radio event in the world. It boasts over 300 trade stands under cover, an open-air flea market of over 1,500 stalls, and over 40 forums and lecture sessions. In previous years Chris Page, G4BUE, had represented the club as part of his private visits to the hamvention. He had seen the potential for a club stand, and the week after Easter the G QRP Club, in the shape of G4BUE, G3RJV, G3VIT, G3PDL and G4LQF, was present at the Dayton Hamvention with a full-sized commercial stand. The club also provided a 2h forum on home construction.

Is there really much interest in QRP operation and construction in the USA—the land of the mighty kilowatt stations and the cheaply-priced commercial equipment? Anyone who reads American amateur radio magazines will know that there seems to be considerable interest in low-power operating and building suitable equipment. Many of the USA magazines, including *CQ*, *73* and *RadioWorld*, have regular QRP columns, and *QST* has been a major source for QRP construction projects, mainly from the pen of Doug Demaw, W1FB. American books such as *QRP Notebook*, *The Joy of QRP*, *Solid State Design for the Radio Amateur* and *Solid State Basics*, all of which are available from the RSGB, are standard reading for QRP operators and constructors. The QRP Amateur Radio Club International (QRP ARC), founded in the USA, is one of the major QRP clubs in the world. So the stage was set for the British to show what they had to offer.

The venture to Dayton was to be self-funding through profits made on the sales of books, kits and club enrolments. After three long days—leaving the hotel at 5am and returning after 6pm—the effort was justified. The interest in the stand was high and the books and kits sold well. The Home Construction Forum was well attended, and prompted sales of kits of parts for QRP projects and books for source material. The five club members who manned

\*Woodstock, Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

\*St Aidan's Vicarage, 498 Manchester Road, Rochdale OL11 3HE.



G3RJV (l) and G4BUE pictured on the G QRP Club stand at the Hamvention in Dayton, Ohio

the stand invested some of their money and a lot of their energy in the venture, but returned home pleased with the results and having enjoyed one of the great experiences of our hobby: attending the Dayton Hamvention.

However, UK amateurs do not have to travel to Ohio to see the G QRP Club in show, as it will have stands at the Scottish Amateur Radio Convention on 13 September at the Magnus Sports and Leisure Centre, Irvine, Ayrshire, and the RSCB HF Convention on 27 September at the Belfry Hotel, near Oxford. At both of these events, club members attending are invited to check in with the stand staff at the beginning of the day and perhaps offer to spend some time on the stand.

### QRP In Australia

During the summer I received a surprise, but very pleasant, visit from Rai Taylor, VK7VV, editor of *Lo Kip*, the club journal for the CW QRP Operators Club of Australia. After a slight lull in its history, this club was reformed by Len O'Donnell, VK5ZF, and is now a thriving concern.

After describing enviable portable expeditions in Tasmania, VK7VV gave me the latest news of the club. One of their major projects recently has been the production of kits of a direct-conversion transceiver called the 'Tas Devil'. This little rig has appeared in various forms in recent issues of the *Lo Kip*. I have received *Lo Kip* since the club began, and can commend it to any keen QRP operator. It is published four times a year, and membership of the club is open to radio amateurs anywhere in the world. The club also sponsors contests, including an annual VK versus The Rest of The World CW QRP Contest. Who else but a lively club could produce a motto for QRP working which reads: "It's not the amount of dog in the fight that counts, it's the amount of fight in the dog".

The membership fee is A\$12 (airmail) a year for its members, with cheques or money orders payable to CW OPS QRP CLUB. The enrolment fee may be sent to Rai Taylor, 25 Twelfth Ave, West Munnah, 7009, Tas, Australia. Payment in lire is not acceptable.

### Calling Constructors

One of the useful consequences of the G QRP Club stand in Dayton was the buying of some items for sale to QRP equipment constructors in the UK. Most of these were obtained in limited numbers and have been offered to members only. One item was bought in slightly larger quantities and may be of interest to constructors who are not members.

Constructors of superb transceivers and receivers probably find that they may be spending more on a decent crystal filter, for selectivity in the i.f. stages, than the total cost of the rest of the components. The G QRP Club is able to offer a limited number of six-pole 9MHz crystal filters with a bandwidth of 2.2kHz for ssb applications. The filters may be obtained from me, at the address at the foot of this column, for £8 each, plus 40p postage. The associated hfo crystals on 8,998.5kHz and 9,001.5kHz are also available in limited numbers at £3 the pair. The crystals are only available with the filter and in pairs. Please make out any cheques to "G QRP Club".

In *QRP* April 1987 I mentioned that the *Hotwater Handbook* had been reprinted and revised by Michael Bryce, WB8VGE, and was once again available from an address in the USA. The book is a must for all HW8 owners, with over 30 simple and practical circuits and ideas to improve the transceiver, but perhaps because they have had to send to the USA for it, few HW8 owners in the UK appear to have bought the book. However, it can now be obtained from Dave Aizlewind, G4WZV, 36 King Street, Winterton, Scunthorpe, South Humberside DN15 9TP. The UK price is £4 incl postage, with cheques to "G QRP Club".

### The international QRP calling frequencies

From time to time people ask me where they might find QRP operation on the hf bands. The majority of this operation is on cw, and international frequencies for QRP working have been agreed by the World QRP Federation (WQF), a grouping of all the national QRP clubs worldwide. Like all such special-interest operating frequencies, they exist only by gentleman's agreement with other band users.

The frequencies in commonest use are: 1,843, 3,560, 7,030 (7,040 in the USA), 10,106, 14,060, 21,060 and 28,060 kHz, all plus or minus existing QRM. It is worth listening for QRP stations on these frequencies and also calling "CQ QRP". In the UK the calling frequency of 3,560kHz is heavily used by QRP operators, and stations can be found on or near that frequency most times of the day and night. The higher frequencies are less used, although I suspect if more QRP stations tried calling CQ rather than just listening briefly and assuming no one is around, there would be more operation on these frequencies.

Naturally these calling frequencies are simply "places of convenience" on the bands to enable QRP operators to have QSOs with each other. In these gentleman's agreements there is no absolute right to a particular piece of the radio frequency spectrum, but it is helpful if these frequencies are noted by QRP and QRO operators alike. Even if you do not use QRP, it is helpful if you bear these frequencies in mind and, if choosing to use one of them, monitor it carefully before putting out a CQ. It is so easy, and some regular QRP operators would say common, to tune up on the frequency and call CQ, without a careful listen first, and completely ruin an existing two-way QRP QSO. It is these everyday practices of good manners that help our hobby, and the world, along a more amiable path.

### Upgrading the Argosy

The Ten Tee Argosy has proved to be a popular transceiver with QRP operators, offering a low power output as well as the full 50W maximum output. The analogue Argosy has now been replaced by the digital Argosy 2, which not only offers a digital readout but new circuitry to overcome some of the endemic problems of the original Argosy circuit: the lack of rf gain control and associated cross modulation, the receiver age characteristics, and the rather sharp (for some) QSK break-in system.

Mike Michaels, W3TS, has supplied me with a considerable amount of information on improvements for the original Argosy, including the fine *Ham Radio* article by WB3JZO. I also have some modification notes by Bill Wright, G0FAH. If Argosy users would like to receive copies of these notes and circuits, please write to me enclosing a large sae and £1 to cover the cost of photocopying. Some of these notes are handwritten, with rough sketches, but the total collection represents a useful body of information for owners of the analogue model Argosy. □

## SATELLITES

Bob Phillips, G4IQQ\*

### RS10/RS11 launch

The major news this month, and probably for the whole of the year, was the successful launch on 23 June of RS10 and RS11. They were launched along with Cosmos 1861, not in the usual piggyback mode but as an integrated part of the main spacecraft payload. RS10 and RS11 have very similar characteristics, the main differences being the slight frequency separations between the corresponding transponders. Each payload has five different modes of operation:

Mode	Uplink	Downlink
K	21MHz	29MHz
T	21MHz	145MHz
A	145MHz	29MHz
KT	21MHz	29MHz and 145MHz
KA	21MHz and 145MHz	29MHz

The first three modes are quite straightforward, but the last two are rather unusual and could prove to be somewhat troublesome both from an operating as well as a licensing point of view. The possibility of selecting one of two uplink frequencies offers some advantages, but the benefits of mode KT are difficult to imagine. I can see certain scientific applications where experiments to analyse the propagation mechanisms at different frequencies might be required, but from the communications point of view—why bother. As a minimum you will be required to listen on both 29 and 145MHz while transmitting on 21MHz.

\*Transval College, New Barn Road, Swanley, Kent BR8 7PW.

Turning to the transponders themselves, the frequency plans are given below:

Mode	RS10		RS11	
	Uplink	Downlink	Uplink	Downlink
K	21-16-21-2	29-36-29-4	21-21-21-25	29-41-29-45
T	21-16-21-2	145-86-145-9	21-21-21-25	145-91-145-95
A	145-86-145-9	29-36-29-4	145-91-145-95	29-41-29-45
KT	21-16-21-2	29-36-29-4 and 145-86-145-9	21-21-21-25	29-41-29-45 and 145-91-145-95
KA	21-16-21-2 and 145-86-145-9	29-36-29-4	21-21-21-25 and 145-91-145-95	29-41-29-45
Beacons		29-357		29-407
		29-403		29-453
		145-857		145-907
		145-903		145-953
Robot	21-12 and 145-82	29-403	21-13 and 145-83	29-453

The output of each transponder is quoted as being 5W, which taken with the relatively low orbital height of around 1,000km, should result in good signal levels.

Each transponder has its own telemetry subsystem with 16 analogue telemetry channels and 16 digital status channels. Each channel carries a two-letter channel identifier followed by two digits to indicate the parameter or status. At the time of writing, the detailed information was not available; however, I will include it in the next issue. One additional point to note is that when the command uplink is in operation, the first letter of the identifier will be modified by the addition of an extra "ili" at the beginning of each channel, eg channel NS would become RNS.

It may take some time to fully check out the satellite, so a fixed operating schedule may not be released for several months. The situation will be further aggravated by the fact that RS10/RS11 operations are almost certain to be secondary to those of the main payload of Cosmos 1861. One problem that has already come to light concerns one of the two frequencies used on the navigation payload, which is at 150MHz. It has been identified that if this transmitter is operated at the same time as the 145MHz uplink, serious intermodulation products are generated. The full impact of the problem has not yet been made known, but it could be that there will be limitations in the use of the 145MHz uplink.

In spite of these problems and the fact that the satellites have been a long time coming, the USSR is to be congratulated on producing a new satellite that is far more likely to appeal to the majority of amateur satellite users than the increasingly difficult to operate varieties emerging from elsewhere—well, that's my opinion and I don't expect everyone to agree with it!

## Uosat

Both satellites UO9 and UO11 are still being put to very good use, with a variety of experiments and transmissions on each. One of the difficulties with the ccd imaging experiment is matching the images with the corresponding area on the earth. Any assistance from observers would be welcomed by the University of Surrey.

The use of the digital communications experiment on UO11 for mailbox operation is growing in popularity, and in response to a number of requests I will summarise the procedures to be followed. In principle, messages are passed to the gateway station at the University of Surrey using AX.25 transmission protocols. The message is then uploaded by the university station to the satellite, and subsequently downloaded by the appropriate receiving gateway station. The gateways currently operational are:

GB3UP University of Surrey  
NK6K Redondo Beach, California for WESTNET  
VK5AGR Adelaide, Australia

To pass the message, it should be addressed to "DCE @ GB3UP". The next line should contain a title for the message for reference purposes. The first line of the actual message should contain the routing information in the format <call> @ <bbs> where <call> is the call of the distant station and <bbs> is the mailbox/bbs local to the distant station. After this follows the message which is terminated by /EX.

## Example:

S DCE @ GB3UP (command to local mailbox)  
my message (title for message)  
N6ABC @ WORLI (see forwarding information)

RS10 and RS11 successfully launched on 23 June 1987 on Cosmos 1861 /EX [terminate message to local mailbox]

I should add that I am not yet on packet, and the above looks somewhat strange, but I am assured that it works. Good luck!

## Oscar 10

Activity on the satellite has been very good for the last few months, and the vast majority of operators have adhered to the requests to run minimum power. In the April *Rad Com* I gave the values of solar illumination for the satellite as calculated by James Miller, G3RUH. Further reference to this data indicates that the illumination will be below the critical 50 per cent value

for the entire months of September and October, and the satellite should therefore not be used until the beginning of November. This request has not yet been made by the satellite controllers, but is very likely to be made. The 145-810MHz beacon should be ON whatever the situation; however, since it no longer carries any telemetry or bulletin board information the latest status should be obtained from either the various satellite nets or the Uosat bulletins. For the record, Amsat-UK continues to operate satellite nets on Sunday (10.15pm), Monday (7pm) and Wednesday (7pm); the frequency is 3,780kHz plus or minus QRM.

# DATA COMMS

Ian Wade, G3NRW\*

## The Cairo connection

I had to admit my ignorance when I read of the so-called Cairo interface in the Raynet column in July's *Rad Com*, and so it was with some interest that I later received a letter from Peter Best, G8CQH, explaining what it was all about. Cairo stands for "Communications Audio Interface for Remote Operations", and was devised by the Salford & Chelmsley Wood Raynet Group. The scheme is based on the use of standard seven-pin DIN connectors, and allows easy switching between different sources of audio input to a radio (eg a voice channel and a data channel).

Obviously the use of such a standard is of great significance in emergency situations, when different pieces of equipment are brought to a single spot and have to be connected together in a hurry. The scheme also has its place in ordinary mobile working, where the use of handheld microphones is now frowned upon while on the move, but where it is desirable to switch to another mic (or perhaps to the packet line) when stationary. Full details of the Cairo interface are included in an eight-page leaflet from Peter Best (tel 021-440 6269) or from Warwick Hall, G4WMH (tel 021-705 0488).

## Fuzzy data

In a letter in June's *Rad Com*, Hans Kreuzer, DL1AN, mentions the problems of high-speed packet, plagued with retries because of the higher probability of corrupted bits, and suggests that we could get away with a 10 per cent error rate for communication. To a certain extent I think he has a good point. For example, experiments are being carried out with digitised speech, where it doesn't really matter if some packets are corrupted, and it is much more important to get the bulk of the message through first time.

However, we already have a very good system for data comms which gets most of it right most of the time; it's called Amtor! Amtor has proved to be much better than packet on the hf bands, for the very reasons that Hans mentions, and I am certain that it will be with us for a long time to come.

But I am equally certain that the vast majority of people using packet today wouldn't dream of considering a new system which couldn't guarantee almost 100 per cent accuracy. With most packet data being relayed through repeaters, it would only take a few errors at each repeater to make the final message totally unrecognisable—this was summed up neatly by one reader who sent me a one-line Prestel message saying simply: "Send three and fourpence, we're going to a dance!" (or perhaps he should have said: "Schick 34 Pfennig, wir gehen tanzen!"), but maybe that doesn't have quite the same ring about it...).

## CCIR 625

A new SITOR/Amtor specification, designated CCIR 625, has recently been published. It provides a moderate upgrade to the basic Amtor protocol, to allow a slave station to determine who has called it. In addition, the secall has been increased from four to seven characters. A station using CCIR 625 can still communicate with existing CCIR 476 stations, but the secall must of course be restricted to four characters for compatibility. Also, existing 476 stations can call a 625 station, provided that the 625 station has been programmed to accept four-character seccalls.

FEC (Collective Mode B) remains the same, except that the 625 sends more end-of-transmission symbols to ensure that the receiving equipment has shut down; this does not cause any incompatibility between 476 and 625. Also, selective FEC (Selective Mode B, not generally used by amateurs) differs between 625 and 476, in that the 625 station can transmit either a four- or seven-character seccall.

Regarding the choice of seccall for CCIR 625, American Amtor guru Paul

\*7 Daubney Close, Harlington, Dunstable, Bedfordshire LU5 6NF.  
Prestel Mailbox 210999743.



Newland, AD7I, recommends the use of a seven-character alpha string, with digits mapped to letters; ie 0=A, 1=B, 2=C, and so on up to 9=J. If the resulting call is less than seven characters, the remaining trailing characters are padded with the last letter. For example, G3NRW would have the call G3NRWW (ie the letter "D" corresponds to the digit 3, and the final two "W"s are pad characters).

Further, if the call sign includes a packet-style ssid (secondary station identifier), this is to be encoded as follows: -0= null, -1=K, -2=L, and so on up to -15=Y. Thus, as another example, the call 9V1QZ-3 would have the call JVBQZMM.

At the moment this is only a suggestion, but, as Paul says, it has the merit of being easy to construct without the use of a calculator or look-up tables. The only situation which it does not cover is the reciprocal prefix or suffix (eg G0/AD7I), so perhaps we could use the letter "Z" to indicate an oblique stroke?

Or does it really matter? All we are concerned about is generating a call which has a high probability of being unique throughout the world; there is no need to identify a call sign by working backwards from a call. As far as I know, there are no implementations of 625 Amlor in place yet, so now is the time to put forward your ideas.

## More on Amlor

Following the piece in June's column on Amlor operation, Frank Barnard, G4FB, writes about station and mode identification. Frank makes the point that the station call sign should be sent periodically in cw or phone, and for data modes in general it would also be useful to indicate the mode (eg Amlor, rty, sstv or fax). To help listeners identify the type of signal. Also, the use of this procedure would help in distinguishing *ham* *de* amateur signals from the many interlopers which populate our bands.

To comment on Frank's points, station identification (in cw or phone) is still a licence requirement; however, the station is usually also identified in the data mode itself. As for mode identification, it is certainly not too easy for beginners to recognise the difference between, say, Mode B Amlor and rty, or between sstv and fax. But if you listen long enough in the part of the band where signals of a particular type are known to congregate, it shouldn't take too long to identify the mode, and then any additional mode identification in phone or rty as described by Frank would become a nuisance. However, this does enable other band users who are not equipped for the data mode to identify the station. What do you think?

## Packet frequencies

At the May meeting of the ARRL Amateur Radio Digital Communications Committee, it was agreed that channel frequency would be specified in future as a *centre* frequency, rather than as a suppressed carrier frequency (as might be shown on a digital frequency display), or as a mark or space frequency. As mentioned in this column in January, this approach is already standard commercial practice, and will eliminate the confusion that arises when different stations use different modem tone pairs.

The committee also discussed the allocation of packet channels on 14MHz. Taking into account the existence of the NCDXF beacon on 14,100kHz, and the probability of upgrading existing mailboxes to 1,200bps, it was agreed to allocate four channels (spaced at 2kHz intervals) between 14,100.5 and 14,110kHz for packet message forwarding. It was further recommended that while the rty sub-band below 14,100kHz is unworkable for message forwarding, its use for general packet QSOs should be encouraged.

More specifically, the following centre frequencies (in kHz) for automatic message forwarding on the hf bands were proposed:

1,802.3	3,594.3*	3,607.3**	7,038.3*	7,091.3**
10,145.3*	10,147.3**	14,102.3*	14,108.3**	18,106.3
18,108.3	24,096.3	21,098.3	24,926.3	24,928.3
28,102.3	28,104.3			

\* = Intercontinental message forwarding frequency

\*\* = North American message forwarding frequency

\*\*\* = Intracontinental message forwarding frequency (ie within a continent)

For an explanation of the "odd" frequencies ending in .3, refer back to January's *Data* Column.

## Late news

In a letter dated 7 July, the FCC gave permission for a limited number of individually-designated USA amateurs to experiment with packet radio, using automatically controlled stations transmitting digital communication below 29.7MHz for a period of 180 days. These will be the ones using the frequencies in the list above. It must be noted, however, that at the 1987 IARU Region 1 conference, it was agreed that, for the present, hf packet radio in Region 1 (which includes the UK) should use the rty band segments only, with a maximum speed of 300Baud and maximum shift frequency of 200Hz. □

# COUNCIL PROCEEDINGS

## A brief report on the Council meeting held on 26 June 1986

**Present:** Mr W J McClintock (President, in the chair), Dr E J Allaway, Messrs J T Barnes, E J Case, Dr J N Gonnaway, Messrs J Greenwell, F D Hall, Mrs J Heathcote, Messrs J D Heys, A A McKenzie, B O'Brien, N F O'Brien, H S Plinchin, F S G Rose, D S Smith, K E V Willis, (members of Council), D A Evans (secretary/general manager), A W Hutchinson (editor), Ms H M Norman (minutes secretary).

Apologies for absence were received from Mr Cornish, who was on holiday, and Dr Evans, who was abroad on business.

## Committee chairmen's reports—1985-86

Each report was considered by Council.

## Hon Treasurer's report

In the absence of the hon treasurer, Mr B O'Brien gave a brief report on the accounts for the nine months to 31 March. It was reported that the Finance & Staff Committee would shortly be recommending a live per cent increase in advertisement rates.

## Secretary's report

The secretary noted that fees for all licences, but not those for amateur radio, were to be increased on 30 June.

The Society had written to its local MP, as a result of proposed new legislation concerning the use of hand-held microphones in cars.

## Committee recommendations

### Education Committee

"The approval of Council is requested for the holding of a home-construction competition at NEC 1987. First announcement to appear in September 1986 issue of *Radio Communication*."

This was approved.

## EMC Committee

"Provisional approval is requested for a member of the EMC Committee to present a paper at the Zurich EMC Conference 1987."

Agreed, with an allocation of £300.

## HF Contests Committee

It was noted that the Commonwealth Contest, previously known as the BERU Contest, was the longest running RSGB hf contest. 1987 was its golden jubilee and to commemorate the event, the committee recommended "That Council awards special mementos to the following:

1. The leading UK entrant.
2. The leading non-UK entrant.
3. The transmitting entrant who had participated in the most Commonwealth and BERU contests over the years.
4. The highest-placed swi entrant."

This was approved.

"As the Milne Trophy cannot be found, on the proposal of the trophies manager, the HFCC recommends that a replacement trophy be purchased at a cost not to exceed £50."

This was approved.

## Membership and representation

Council noted that:

- (i) Reduced subscriptions had been granted to a further 28 members.
- (ii) Waived subscriptions had been granted to a further nine members.
- (iii) Allotment had been granted to: All Saints AR & Electronics Club, Nottingham; Barnsley & District ARC; BEMRS Social Club Radio Group, BF053; Binwell (Robin Hood) ARC, Nottingham; Central Lancs ARC, Chorley; Congleton ARC, Cheshire; International Listeners Association, Swansea;

Louth & DARC, Lincs; Midland ARS, Birmingham; North Ferriby United Radio Amateur Society, Hull; Remote Imaging Group, Beds; Rosendale ARS; Thorn-EMI Electronics, Feltham, Middx; Tynce & Wear Repairs Group, Co Durham; Tyndale ARC, Newcastle; Lansbeck Amateur Radio Association, Northumbria; York Radio Club (Amateur).  
(iv) That the following area representative appointments had been made:  
D Axford, G4LHU ..... Medway Towns  
M W Bannerman, GM3ZXE ..... Forlar and District  
A S S Low, GM4UZZ ..... Dundee  
G R Wilkinson, G4YKO ..... Scarborough  
(v) Life membership had been granted to Mr D J Kirkham, G8SFU.

## IARU Region 1 Conference 1987

In recognising the need for strong international representation, Council approved the attendance of nine delegates—identities to be considered at a later date.

## IARU Constitution and Byelaws

The proposed amendments, which had been endorsed by the Society's IARU Committee, were approved by Council.

## A brief report on the Council meeting held on 9 August 1986

**Present:** Mr W J McClintock (President, in the chair), Dr E J Allaway, Messrs J T Barnes, E J Case, Drs D S Evans, J N Gonnaway, Messrs J Greenwell, F D Hall, Mrs J Heathcote, Messrs A A McKenzie, B O'Brien, N F O'Brien, H S Plinchin, F S G Rose, D S Smith, K E V



Willis (members of Council), D A Evans (secretary/chief executive), Ms H M Norman (minutes secretary). Apologies for absence were received from Mr Cornish; Mr Heys, who was unwell; and Mr Hutchinson (editor) who was on leave.

#### Hon Treasurer's report

In the absence of the hon treasurer, Mr B O'Brien gave a brief report on the current financial state of the Society. He reported that it was intended to set aside a sum of money for essential building works at headquarters. This would include work necessary under the Fire Regulations.

#### Secretary's report

The secretary spoke of the importance of introducing newcomers to amateur radio, reporting on several future mailing shots which were planned.

Mr Evans then described the new organisational structure of HO staff which it would now be possible to implement following recruitment of the new HO manager. Council approved the proposals, which had been agreed by F & S.

The secretary reported on recent meetings held with representatives of the DTI to express the Society's concern at the lengthy DTI procedures leading to beacon and repeater licensing. The procedure, which currently involved some 52 government departments, was under review with an aim of greatly reducing the timescales.

Referring to amc matters, Mr Evans spoke of the need for an official "code of practice".

The secretary reported that the RSGB was now on Preslist—3,000 accesses having been logged during the first five days.

Council was asked to sign two certificates as a gesture of their appreciation to two volunteers. These were Mr R Bellerby, G3ZYE, who had recently resigned as a GB2RS newsreader, and Mrs Jane Balesirini, who had retired after 17 years' service as Raynet supplies officer.

#### Committee recommendations

##### EMC Committee

"That the Louis Varney, G5RV, Trophy's terms of reference be widened to cover outstanding contributions in the emc field."

This was approved.

##### Exhibition & Rally Committee

"That the 1987 RSGB National Convention be held at the NEC on 27, 28 and 29 March 1987, and promotion for the event be commenced as soon as possible."

Council considered the question of holding the event for more than two days, and this would be referred back to the committee for further information. In the meantime, the venue was accepted by Council.

##### Finance & Staff Committee

"When a waived subscription has been granted to a member prior to state pensionable age, it shall be extended automatically when the member reaches that age."

This was approved.

##### IARU Committee

"That Mrs P Gleisher, G4RWW, secretary of the HF Contests Committee, attends the 1987 Regional Conference as an observer, at no expense to the RSGB."

This was approved.

##### HF Committee

"That the Robe Trophy be awarded to Mr J Forward, G3HTA, and be presented at the HF Convention."

This was approved.

#### Membership and representation

Council noted that:

(i) Reduced subscriptions had been granted to a further 55 members.

(ii) Waived subscriptions had been granted to a further four members.

(iii) Alliliation had been granted to:

Galway Radio Experimenters Club, Ireland;

Wicklow Amateur Radio Club, Ireland.

(iv) That Mr D G Manning, G4VXR, had been appointed free representative for Norwich.

#### Vice-Presidency

Council unanimously agreed to elect Major K E S Ellis, G5KW, a vice-President of the Society.

#### Chairmanship of the Technical & Publications Committee

Following the secondment to Germany of Dr D S Evans, G3RPE, Council approved the recommendation from the Presidential Advisory Group that Mr Peter Chadwick, G3RZP, be appointed chairman of the T & P Committee.

The president expressed Council's thanks to Dr Evans for his past work for this committee.

#### Memorandum & Articles of Association

Council approved the principles contained in the following amendments, to be put to an extraordinary general meeting of the Society in December:

1. It should be possible for the President to serve for a second, consecutive year, subject to re-appointment.

2. The minimum time a member must have been a corporate member of the RSGB before becoming a member of Council to be increased from three to five years.

3. A similar timescale to be placed on nominators.

4. The quorum for Council to be increased from 7 to 11.

The Society's solicitors would now be asked to draft the appropriate Articles to include these changes, so that the exact wording could be put to the egm.

#### Morse testing

Mr McKenzie spoke of a recent meeting of representatives from the RAIBC and the RSGB, held to consider special requirements for disabled amateurs who wished to take the morse test. Recommendations from the meeting were to be submitted to the Society's chief morse examiner and the RSGB Morse Steering Committee for ratification prior to consultation with the DTI.

#### Shetland Islands prefix

The DTI had rejected a request for a special prefix, on the grounds of the expense involved in selling such a precedent.

#### World ARDF Championships 1986

Council approved the attendance of the secretary at this event, to be held in Yugoslavia as a means of gaining information about this activity, IARU style, and because of the implications to licensing in the UK.

#### EMC Conference—York

It was hoped that this would be attended by a representative from RSGB.

### A brief report on the Council meeting held on 25 September 1986

**Present:** Mr W J McClintock (President, in the chair), Dr E J Allaway, Messrs J T Barnes, E J Case, Dr J N Gannaway, Messrs J Greenwell, F D Hall, Mrs J Heathershaw, Messrs J D Heys, A A McKenzie, B O'Brien, N F O'Brien, H S Pinchin, F S G Rose, D S Smith (members of Council), D A Evans (secretary/chief executive), A W Hutchinson (editor), Mrs R Evans (minutes secretary).

Apologies were received from Mr Cornish and Dr Evans, who were absent due to business commitments.

#### Executive vice-President

Since the last meeting, Mr K E V Willis had tendered his resignation from Council. In noting that Mr Hall had been nominated for this post in January, Council decided that Mr Hall should become evp until the end of the year. It would be the prerogative of the 1987 Council to appoint his evp in January 1987.

Council resolved not to co-opt a member to fill the casual vacancy on Council.

#### Planning Advisory Committee

In view of the increasing work in this area, Council agreed that a new committee should be convened, under the chairmanship of Mr H Fenton, G8GG, following further discussion with the Working Group.

#### Hon Treasurer's report

Council noted with appreciation the detailed and comprehensive report prepared by the hon treasurer.

The accounts for the financial year ending 30 June 1986 were then considered and approved unanimously.

#### Secretary's report

The secretary reported on a number of matters.

The new HO manager had now taken up his appointment and was becoming involved with the day-to-day administration of HO.

Mr Evans spoke of the need to encourage more youngsters into the hobby. This was an on-going project which required a considerable amount of background work if it were to be successful.

It had been agreed to publish a newsletter dealing with packet radio. The first issue would be available in October.

The subject of emc was one which continued to demand effort from the Society. Publication of the "11-point plan" had been well-received, resulting in offers of support in this area from members. The EMC Committee would tackle the work involved.

#### Committee recommendations

##### Technical & Publications Committee

The following proposals were agreed:

**Ostermayer Trophy**—new terms of reference to read: "To be awarded for the best article in *Radio Communication* for home-constructed equipment published during the year ended 30 June."

This was to be awarded to Mr John Matthews, G3WZT, for "A single-stage linear amplifier for 50MHz", published in the June 1986 issue of *Radio Communication*.

**Courtney Price Trophy**—New terms of reference to read: "Most outstanding published technical contribution to amateur radio during the year ending 30 June."

To be awarded to Dr Ian White, G3SEK, for his series of articles entitled "Modern VHF/UHF front-end design", the final part of which was published in the July 1985 issue of *Radio Communication*.

**Norman Keith Adams Prize**—To be awarded to Mr V C Leer, G3TKN, for "Gamma matching networks and misfits at lower frequencies", published in the March 1986 issue of *Radio Communication*. (Terms of reference unchanged).

#### VHF Contests Committee

Approval was given to the following allocation of awards:

**VHF Contests Committee Cup** to the Parallel Lines Contest Group, as overall winners of the 1,296MHz Trophy Contest 1986.

**1951 Council Cup** to the Warrington Contest Group as overall winners of the 432MHz Trophy Contest 1986.

#### IARU Committee

(a) It was agreed that Mr J Greenwell, G3AEZ, should attend, as an observer, the IARU Region 1 Conference, to be held next April.

(b) It was agreed that the secretary should attend the above-mentioned IARU Region 1 Conference.

#### EMC Committee

Council agreed the recommendation that the G5RV Trophy should be awarded to Mr Neil Brinkworth, G3UFB, for his contributions in the emc field.

#### Education Committee

Council approved the appointment of Mr E J Case, G4HWR, to the City & Guilds RAE Advisory Committee. This was to replace Mr M Shallow, G3SZJ, who had resigned.

#### Membership and representation

Council noted the granting of 95 reduced and seven waived subscriptions.

The following clubs had become affiliated:

Cork Radio Club, Co Cork, Ireland;

King John School ARC, Benlloch, Essex;

Orkney-Caithness Repeater Group, Orkney;

Pembrokeshire Radio Society, Haverfordwest, Dyfed;

Rowner & DARS, Portsmouth, Hants;

Norfolk College of Arts & Technology ARC, Kings Lynn, Norfolk.

#### Radio Communication

Referring to a paper tabled by Mr Heys, Council considered the content and style of *Radio Communication*, noting possible improvements which could be made.

#### RSGB 75th Anniversary

The secretary circulated a discussion paper which outlined possibilities for celebrating this event during 1988.

### A brief report on the Council meeting held on 25 October 1986

**Present:** Mr W J McClintock (President, in the chair), Messrs J T Barnes, E J Case, Dr J N Gannaway, Messrs J Greenwell, F D Hall, Mrs J Heathershaw, Messrs J D Heys, A A McKenzie, B O'Brien, N F O'Brien, H S Pinchin, F S G Rose, D S Smith (members of Council), D A Evans (secretary/chief executive), Mrs R Evans (minutes secretary).

Apologies for absence had been received from Mr Cornish, Dr Allaway, Dr Evans and Mr Hutchinson.

#### Hon Treasurer's report

In the absence of the hon treasurer, Mr B O'Brien summarised the annual accounts. The secretary spoke of evidence to suggest that general sales of amateur radio equipment had reduced substantially in the last year or so. He added that the number of candidates taking the RAE had decreased by 50 per cent. It was felt that the Society had done well to produce a surplus in the current financial climate. However, the secretary predicted that the current financial year (1986-87) would be a difficult one in which the Society would not make a surplus.

#### Secretary's report

The secretary reported on a number of matters.

A meeting of committee chairmen had been held in

order to discuss the Society's 1987 national exhibition at the NEC.

Council noted the publication of two new books—*Buyers' Guide to Amateur Radio* and the *Autumn 1986 Call Book*.

Mr Evans spoke of the recent meeting he and the chairman of the Licensing Advisory Committee had attended with representatives of the DTI, to discuss the Society's 11-point plan with regard to emc. This plan had been well-received by the DTI.

The possibility of the Society's involvement with scientific bodies, such as The British Association of Young Scientists, was discussed, as a means of introducing amateur radio to youngsters.

#### Membership and representation

Council noted the granting of 80 reduced and two waived subscriptions.

The following clubs had become affiliated:

Cummock & DARG, Ayrshire;  
Wigen & DARC.

Two new area representatives had been appointed: Mr D J Chislett, G4XDU (Slough/Maidenhead) and C Maltheyman, GD4FWQ (Isle of Man).

#### Membership & Representation Committee

Council resolved to nullify the form of reference, contained in the current Green Book, which stated that the executive vice-President should be chairman of the M & R Committee.

It was then unanimously agreed that Mr O Smith, G4DAX, be appointed chairman of this committee, pending review of its future.

#### Council Awards

It was agreed that the *Founders Trophy* should be awarded to Mr J J Yeend, G3CGD, for his service to the Society in his involvement with the slow morse practice transmissions service, which had started in 1949.

Council agreed to award the *Calcutta Key* to Dr E J

Allaway, G3FKM, for his great contribution to International friendship.

#### 1987 Council elections

Council approved the list of scrutineers, tabled by the secretary.

#### 1986 annual general meeting

The draft agenda was approved.

#### Editorial board

A "Think-tank" was set up to discuss *Radio Communication*, prior to the first meeting of the new editorial board.

We regret that publication of these "Council Proceedings" has been delayed due to staff shortage resulting from the move of the editorial office from Chelmsford to Pollers Bar.

# Contest News

## Region Round-up Contest 1987

The entry for the 1987 Region Round-up Contest was disappointingly low again. Many commented on the length of the contest compared to the activity level, and proposed that the contest should be made much "shorter and snappier". The HF Contests Committee will take all comments into account when considering the format of next year's event.

Certificates will be awarded to the leading three stations in each section.

OPEN SECTION					
Posn	Callsgn	Points	Posn	Callsgn	Points
1	G3SXW	9,887	15	G4BUO	5,400
2	G4DJX	8,448	16	GM3VEY	5,264
3	G5LP	8,220	17	G3GMS	4,238
4	G3TBK	7,998	18	G3SHY	3,588
5	G3SJK	7,905	19	GM3UM	3,450
6	G3JKS	7,719	20	G3AWR	3,427
7	G3YDV	7,453	21	G4FJZ	2,560
8	G3WVG	7,424	22	G3TFF	2,289
9	G4WYG	7,068	23	G3BPM	2,272
10	G3SWH	6,757	24	G3ILO	1,768
11	G5MY	6,464	25	G3OLB	1,755
12	G4BJJ	6,129	26	G3MCK	1,320
13	G4WON	5,820	27	G3UZN	1,118
14	G4QGB	5,694			

ORP SECTION					
Posn	Callsgn	Points	Posn	Callsgn	Points
1	G4ARI	5,325	4	GW3SB	1,425
2	G3KDB	3,160	5	G0FKX	1,360
3	G3KKO	1,683	6	G3JSK	1,056

RECEIVING SECTION	
1	B1S1066 4,392

## Second 1.8MHz Contest 1987 rules

1. The general rules for RSGB hf contests, as published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply.

2. Date and time, 2100gmt Saturday 14 November to 0100gmt Sunday 15 November 1987.

3. Sections. (a) British Isles (b) Overseas (including EI). Single-operator entries only. British Isles entrants must also be members of RSGB.

4. Band and Mode: 1.820–1.870kHz, cw only.

5. Exchange. RST plus serial number starting at 001. British Isles stations must also give their county code as shown in the "Operating Guide".

6. Scoring.

(a) British Isles Stations: three points for each completed contact, with a bonus of five points for the first contact with each British Isles county and for the first contact with each country outside the British Isles.

(b) Overseas Stations: three points for each completed contact with a station in the British Isles (not EI) with a bonus of five points for the first contact with each British Isles county.

7. Logs. Logs to be headed: date/gmt; callsgn; RST/number sent; RST/number received; Code received; bonus; points. Duplicate contacts must be clearly marked and must not be claimed for points. Unmarked duplicates will be penalised at the rate of 10 times the number of points claimed—logs containing more than five unmarked duplicates for which points have been claimed will normally be disqualified. Each entry must be accompanied by a cover sheet which includes the following declaration: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute."

Note. Data from logs entered for this contest may be entered into a computer for the purposes of checking. Any entrant objecting to this must state clearly on the cover sheet, in order that his entry may be checked by hand.

8. Address for entries. Address logs to "RSGB HF Contests Committee" c/o S V Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Croydon, Surrey, CR4 7AF.

9. Date for entries. Logs must be postmarked not later than 15 days after the end of the contest.

#### 10. Awards.

(a) The Victor Desmond Trophy will be awarded to the winning station in the British Isles, and certificates of merit will be awarded to the second and third placed entrants.

(b) The Mallard Trophy will be awarded to the Scottish entrant with the highest aggregate score in this contest combined with the First 1.8MHz Contest of 1988.

(c) Certificates of merit will be awarded to the first three stations in the overseas section, and, at the discretion of the HF Contests Committee, to the leading entrant from each overseas country.

#### 11. Receiving section.

(1) Transmitting section rules 1, 2, 3, 4, 6, 7, 8 and 9 will apply.

(2) Logs to be headed: Date/gmt; Callsgn of station heard; RST/serial number/County code sent by that station; Callsgn of station being worked. A station may appear only once in the column headed "Station heard". Callsigns of stations being worked may only repeat once in every three contacts logged.

(3) Certificates of merit will be awarded to the leading three entrants.

(4) Holders of British Class B licences may enter the receiving section.

## Contests Calendar

### RSGB HF CONTESTS

5, 8 Sept	SSB FD (Rules in June Issue)
6 Sept	DF Qualifying, Slade (Details in August Issue)
20 Sept	DF National Final, Mid-Thames
Sept–Oct	28MHz CW Cumulative (Rules in July Issue)
11 Oct	21/28MHz SSB (Rules in May Issue)
18 Oct	21MHz CW (Rules in June Issue)
24 Oct	DF Troble Night, Mid-Thames
Nov–Dec	28MHz Phone Cumulative (Rules in July Issue)
14, 15 Nov	2nd 1.8MHz (Rules in September Issue)

### RSGB VHF CONTESTS

5, 6 Sept	144MHz Trophy & SWL (Rules in June Issue)
5, 6 Sept	IARU Region 1 VHF & SWL (Rules in June Issue)
13 Sept	10GHz Cumulative (Rules in March Issue)
20 Sept	70MHz Trophy & SWL (Rules in August Issue)
3, 4 Oct	IARU UHF/SHF & SWL (Rules in June Issue)
3, 4 Oct	432–240GHz & SWL (Rules in August Issue)
8 Oct	432MHz Cumulative (Rules in August Issue)
16 Oct	1-3/2-3GHz Cumulative (Rules in August Issue)
24 Oct	432MHz Cumulative (Rules in August Issue)
25 Oct	70MHz Fixed (Rules in August Issue)
1 Nov	1-3/2-3GHz Cumulative (Rules in August Issue)
7, 8 Nov	144MHz CW (Rules in August Issue)
9 Nov	432MHz Cumulative (Rules in August Issue)
17 Nov	1-3/2-3GHz Cumulative (Rules in August Issue)
25 Nov	432MHz Cumulative (Rules in August Issue)
3 Dec	1-3/2-3GHz Cumulative (Rules in August Issue)
6 Dec	144MHz Fixed & AFS
11 Dec	432MHz Cumulative (Rules in August Issue)
13 Dec	70MHz CW
19 Dec	1-3/2-3GHz Cumulative (Rules in August Issue)

### OTHER CONTESTS

8 Sept	LZ OX (Rules in August HF)
9, 11 Sept	Howdy Days (Rules in August HF)
12, 13 Sept	European DX SSB (Rules in August HF)
19, 20 Sept	Scandinavian Activity CW (Rules in August HF)
26, 27 Sept	Scandinavian Activity SSB (Rules in August HF)
3, 4 Oct	Columbus (Rules in September HF)
3, 4 Oct	International DX–HC Middle of the World (Rules in September HF)
3, 4 Oct	VK/ZL/Oceania Phone (Rules in September HF)
10, 11 Oct	VK/ZL/Oceania CW (Rules in September HF)
24, 25 Oct	CQ WW DX Phone (Rules in October HF)
14, 15 Nov	European DX RTTY (Rules in August HF)

# Club News

The following is the latest information received by RRs from the RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organisations will be published again in January 1988.

RSGB affiliated organisations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the November issue should reach them by 14 September, and for the December issue by 12 October.

Club programmes are given in order of date, subject, time and place of meeting. All callsigns of club secretaries and other contacts are OTHER (correct in the current RSGB Call Book) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

**REGIDN 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3544.**

**Bury (BRS, G3BRS)—8 Sep** ("Electricity metering", N Nurney—NRWEEB). 8pm. Mosses Community Centre, Cecil St, Bury. Details G1VOE, tel 061-796 5296.

**Chester (C&DRS, G3GIZ/G8GIZ)—1 Sep** (Committee meeting), 8 ("Satellites", GW4GF), 15, 22 (Iba), 29 ("What leaves the antenna", G3EON). 8pm. Chester RUFC, Hare La, Vickers Cross, Chester. Details G6IFA, tel Chester 336639.

**Leyland (Central Lancs ARC)—1 Sep** (SSB Field Day, details G4OBK/G1AHM), 7 (SSB postmortem), 21 (Iba), 5 Oct (Junk sale), 8pm. The Priory Club, Broadfield Drive, Leyland. Details G4ZYN, tel 0257 452287.

**Liverpool (L&DARS, G3AHD/G8WCL)—1 Sep** (Junk sale), 8 (Dulz), 15 (Open night), 22 ("Intelligence testing", G6GOX), 29 (Pra agm) 8pm. The Churchill Conservative Club, Church Road, Liverpool 15. Sec Lynn, tel 061-728 8811.

**Manchester (South MRC G3VFA/G3UHF)—4 Sep** ("Radio Intelligence", G2AKK), 11 ("Radio waves, explosive gasses and detonators", A Bishop), 18 (Radio clinic), 25 (Surplus equipment sale), 2 Oct ("Microwave Modules equipment", G4EFO). 8pm. Sele Moor Community Centre, Norris Road, Sale. Details G2AKR.

**Rossendale (RARS)—9 Sep** (Fox Hunt), 8pm. The Huntsmen, Bury Rd, Loveclough, Rossendale. Sec G4VVK, tel 0706 214076.

**Thornton Cleveleys (TCARS)—2 Sep** (Visit to Blackpool airport), 7 ("Panoramic reception", T Tarr), 14 ("Signal processing", N Bradshaw), 21 ("Beginning construction", G3RJV), 28 (Informal), 7.45pm. Isl Norbreck Scout HD, Carr Rd, Blispham, Blackpool. Club net Sundays 11am, G4ATH on 1-855MHz. Details G4BHF, tel 0253 853554.

**Warrington (WARC, G4CDA/G6WRC)—1 Sep** (Junk sale), 8pm. Grappenhall Community Centre, Boli House Le, Grappenhall, Warrington. Details G0BCN, tel 0925 814005.

**Wyre (WARS)—5, 6 Sept** (144MHz phone contest trophy), 8pm. Breck Squash Club, Breck Rd, Poulton. Sec G4UHI, tel 0253 854745.

I wish to thank both Thornton Cleveleys ARS and Chester RC for their hospitality during my recent visits. Please note that Trelford ARC are holding their rally on Sunday 20 September at Did Trelford Cricket Ground (see page 517 of July Rad Com). Liverpool and DARS hold their annual pilgrimage to the Isle of Man from 3 to 15 September and will be operational on all bands. Information from G4CVZ, tel 051-220 5470. **RR1**

**REGION 2—RR P R Sheppard G4EJP, 9 Elvington Crescent, Leconfield, Beverley, North Humberside HU17 7LD. Tel 0401 50397.**

**Barnesley (UK FM Group Northern G6KRM)—6 Sep** (Monthly meeting), Royal Hotel, Barnesley. Details G4UNA.

**Goole (GR&ES G0GLE)—4 Sep** (Natter night), 11 (Video evening), 18 (agm), 25 (Social evening), 8pm. The Pavilion, West Park. Details G0GLZ, tel 0405 69968.

**Hallifax (H&DARS, G2UG)—15 Sep** (agm). Running Man ph. Details G0DLM, tel 0422 202306.

**Hellax (Northern Heights ARS G4NDK)—2 Sep** ("Large screen tv"), 15 ("Electronic gas detectors", G0BZH), 29 (Visit to Keighley for quiz). Bradshaw Tavern, Hallifax. Details G3UL, tel 0422 60574.

**Keighley (KARS RS84851)—8 Sep** (Informal), 29 (Dulz

evening with guest team from Northern Heights). Victoria Hotel. Details G1IGH, tel 0274 496222.

**Leconfield (RCTARS G4GGD)—3 Sep** (Monthly meeting), Normandy Barracks. Details G4EJP, tel 0401 50397.

**Sheffield (SARC)—5, 6 Sep** (Special event weekend), 9 (Talk on Christian Aid), 13 (Trip to Lincoln Hamlet), 21 (Raynal talk), 8pm. Firih Pavillion, Sheffield. Details G8ZHG, tel 0723 395287.

**Todmorden (T&DARS, G4WYT)—7 Sep** (Talk by Dr D Bunn), 21 (Natter night). Queen Hotel, Details G1GZB, tel 0706 817572.

**WACRAL (G3NJB)—11-13 Sep** (Conference weekend at London Bible College). Details G3AGX, tel 0482 82275.

**Wakelield (North Wakelield ARC G4NDK)—3 Sep** (agm), 10 (Junk sale), 17 ("Tomorrow's technology today", G3ZXZ), 24 (Monthly meeting). White Horse ph, Wakelield. Details G4RCH, tel 0532 536633.

**York (YRCA G4YRC)—8 Sep** ("Test your rig", G4FUD), 22 ("Photography", G4YXZ). Ashcroft Hotel, York. Details G3WOM, tel 0904 793672.

Thanks for hospitality to Keighley ARS. **RR2**

**REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0263 616941.**

**Birmingham (Midland ARS)—15 Sep** (Surplus equipment sale), 21 (Junk sale), 28 (Junk sale), 5 Oct (Junk sale), 12 Oct (Junk sale), 19 Oct (Junk sale), 26 Oct (Junk sale), 2 Nov (Junk sale), 9 Nov (Junk sale), 16 Nov (Junk sale), 23 Nov (Junk sale), 30 Nov (Junk sale), 7 Dec (Junk sale), 14 Dec (Junk sale), 21 Dec (Junk sale), 28 Dec (Junk sale), 4 Jan (Junk sale), 11 Jan (Junk sale), 18 Jan (Junk sale), 25 Jan (Junk sale), 1 Feb (Junk sale), 8 Feb (Junk sale), 15 Feb (Junk sale), 22 Feb (Junk sale), 1 Mar (Junk sale), 8 Mar (Junk sale), 15 Mar (Junk sale), 22 Mar (Junk sale), 29 Mar (Junk sale), 5 Apr (Junk sale), 12 Apr (Junk sale), 19 Apr (Junk sale), 26 Apr (Junk sale), 3 May (Junk sale), 10 May (Junk sale), 17 May (Junk sale), 24 May (Junk sale), 31 May (Junk sale), 7 Jun (Junk sale), 14 Jun (Junk sale), 21 Jun (Junk sale), 28 Jun (Junk sale), 5 Jul (Junk sale), 12 Jul (Junk sale), 19 Jul (Junk sale), 26 Jul (Junk sale), 2 Aug (Junk sale), 9 Aug (Junk sale), 16 Aug (Junk sale), 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7.45pm. Marle Place, Leylands Road, Bnrgess Hill, Details GOGNV, tel Burgess Hill 41407.

**Dartford (ODFC)**—6 Sep. (Qualifying event), 8 (Pre-hunt meeting), 20 (Final pre-hunt meeting at Horse & Groom ph, Leyton Cross, eller 9pm). Details G8DYF, tel Greenhithe 844467.

**Dover (SE Kent YMCA ARC)**—2 Sep (Natter night), 9 (Talk by GAMZO), 16 (Talk by G3RJV), 23 (Snrplus sale), 30 Sep (Natter night). Dover YMCA, Godwynethurst, Leyburne Road, Dover. Details John Dobson, Flal 3, 145 Snargale St, Dover, CT17 9BZ.

**Eesibourne (Southdown ARS)**—19/20 Sep (Visit to Radio Club de Normandie). 7.30pm. Chaseley Home, Southcliff, Bolsover Rd, Easibourne. Classes and meetings also held every Tuesday and Wednesday. 7.30pm. Hailsham Lalsure Centre, Vicarage Lane, Hailsham. Sec GIUTH, tel Crowborough 63051.

**Gillingham (Bredhurst R&TS)**—3 Sep ("Howes your construction", D and C Howes), 17 ("Mora thoughts on ORP and home brewing", G3RJV), 20 (Construction and natter night), 7.30pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. Details G0AMZ, tel Medway 378991.

**Gillingham (MARTS)**—4 Sep (Natter night), 11 (Crime prevention talk), 18 (Natter night), 25 ("Packet radio", G4VSS). 7.30pm. Matthews Riding School, Lower Rainham Rd, Gillingham. Sec GIMSS, tel 0474 814874.

**Hastings (HERC)**—16 Sep (Satellite tv), 7.30pm, West Hill Community Centre, Croll Road, Hastings. Details G4NVO, tel Hastings 420608.

**Herne Bay (East Kent RS)**—3 Sep ("Antenna experiments", G4LOI), 17 (Natter night at club shack), 7.30pm. Cabin Youth Centre, Kings Road, Herne Bay. Details GARIS, tel 0227 262042.

**Horsham (HARC)**—3 Sep (Junk sale), 7.30pm. Guide Hall, Danne Road, Horsham. Sec G4UDU, tel Worthing 60695.

**Maldstone (MYMCAARS)**—4 Sep (Open evening for beginners and new members), 11, 25 (Natter night, RAE and cw), 18 ("Power transformers"). 8pm. YMCA Sportscentre, Melrose Close, Maldstone. Details G0BUW, tel 0622 30544.

**Margate (Radio Club of Thanet)**—8 Sep (Film show), 22 (Inter-club quiz), 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Sec GIHWG, tel 0843 42480.

**Worthing (W&OARC)**—2, 16 Sep (Ragchew and workshop evening), 9 (Ibe), 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4SWH, WADARC, PO Box 599, Worthing, BN14 7TT.

Many thanks for the courtesy extended to me during my recent visits to: Horsham ARC, Radio Club of Thanet and Medway ARS. ARR

**REGION 9—RR A H Hammell, Rosehill, Ladock, Truro, Cornwall TR2 4PO** Tel 0728-882 758.

**Axminster (Axe Vale ARC)**—4 Sep (Talk by G3GC). Details G3VW, tel Lyme Regis 5282.

**Exeter (EARS)**—14 Sep (Talk on Raynor). Details G3YBK, tel 0392 78710.

**Redruth (CRAC)**—3, 20 Sep (Activily evening), 14 ("Practical computing for the visually impaired"). Details G4ZUI, tel Stihlans 860 572.

**REGION 10—DH Phillips, GW4KO, 17 Penre Gardens, Grangeflow, Cardiff CF1 7QJ.** Tel 0222 35648.

**Cerdill (CRSGB GWSBI)**—14 Sep ("Microwave Modules converters and amps", GW8CMU). Sec GW0GUM, tel 04463 3212.

**Cordiff (Highfields ARC GW4LFO, GW1LFO)**—3 Sep (Workshop, GW4REX), 10 (Discussion on Sunday 13/A location at the Brecon Mountain Centre, with GW0HDO), 17 (Natter night), 24 ("Fire Service communications", GW6UGD), 1 Oct (Technical lecture by GW4HWR). Sec GW6ZHM, tel 0222 750315.

**Powys (PARC GW4HVN)**—10 Sep ("Test your rig/ equipment", G3UQH). Sec GW4DWX, tel 0938 2068.

**Rhondda (RARS GW2FOF)**—3 Sep ("Introduction to alv and satellite dish reception", GW8LJJ), 17 (Slide show—WAC awards, GW3CDH). Sec GW4BUZ, tel 0443 432542. Enrolment for the amateur radio course starting in Sep at Rhondda College is now taking place. Phone the college on 0443 432187 for details.

**Swansea (SARS GW4CC)**—5, 6 Sep (SSB field day at Swansea University Playing fields). 7.30pm. Room 303, Applied Sciences Bldg, University College of Swansea. Details GW0BBO, tel 0792 818100.

**REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Conrt, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH.** Tel 0492 49288.

**Colwyn Bay (Conwy Valley ARC GW6TM)**—10 Sep (Annual junk sale), 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. New sec GW0DSL, tel 07456 5529.

**Oeeside (Alyn & DARS)**—5, 6 (144MHz contest), 22 ("Satellite tv", G4EZO), 6 Oct (Snrplus equipment sale), 8pm. Shollon Social Club, Shollon La, Deeside. Sec GW1ILZ.

**REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Plllochry, Perthshire PH16 5HH.** Tel 0758 2140 Presiel 107962140.

**Aberdeen (AARC)**—4 Sep (Jnnk sale), 5, 6 (144MHz trophy IARU VHF & SWL and SSB NFO), 11 (Building competition), 13 (SARCON, bus arranged), 18 ("Cross field antenna systems", GM4HAT), 25 (Beetle drive with wine), 2 Oct (Junk sale). 7.30pm, 35 Thistle La, Aberdeen. Sec GM4GXD, tel Pllpcale 251.

**REGION 14—RR T G Wylla, GM4FOM, 3 Kings Crescent, Elderslie PA 9AD.** Tel Johnstone (0595) 22749.

**Ayr (AARG)**—Second Friday of the month, 7.30pm. Community Leisure Centre, 24 Wellington Square, Ayr. Sec GM4CUB.

**Cumnock (C&OARC)**—First Thursday of the month. Netherthrd Community Centre, Cumnock. Details GM1SXZ, tel Cumnock 38786.

**Oumfries (O&G REC)**—First and third Mondays of the month. The Cargenhalm Hotel, New Abbey Road, Oumfries. Details GM6LYJ, tel Oumfries 54056.

**Dumfries (MARK)**—First and third Wednesdays of the month. The Tem O'Shanter Inn, Queensbury Street, Oumfries. Details GM4NNC.

**Dunoon (D&DARC)**—Fridays, 7.30pm. Community Centre, Edward St, Dunoon. Sec GM0BUL.

**Glasgow (WOSARS)**—Thursdays, 7.30pm. 154 Ingram Street, Glasgow. Sec GM0EFH.

**Greenock (G&DARC)**—Fridays, 7.30pm. 22 Inverkip St, Greenock. 7.30pm. Sec GM0ADF.

**Helensburgh (H&OARC)**—Thursdays, 7.30pm. Caldndu House, Rhu Rd, Helensburgh, Sec J Thompson, 37 Grant St, Helensburgh.

**Irvine (C&DARC)**—Thursdays, 7.30pm. The Green Room, The Magnus Centre, Irvine. Sec GM3DJS.

**Kilmarnock (K&LARC)**—8 Sep ("VHF & UHF", GM4COX), 22 ("The Secret Listeners" RSGB video). The Glenfield Social Club, Queens Drive, Kilmarnock. Sec GM1VZF, tel Kilmarnock 24665.

**Loch Lomond (LLARC)**—Tuesdays, 7pm. Bonhill Oykes Primary School, Bonhill. Sec GM4LKJ.

**Motherwell (MLARS)**—Fridays, 7.30pm. Wrangholm Hall Community Centre, Motherwell. Sec GM1SSA, tel Holytown 732403.

**Stirling (SADARS)**—Second and fourth Thursdays of the month. The Argyll Centre, Stirling. Sec GM0BFS.

**Siranraar (WARC)**—Thursdays, 7.30pm. The Community Centre, Lewis St, Siranraar. Sec GM4BAE.

**REGION 15—RR A Parsons, G13HXV, 27 Mendeville Avenue, Siralsheden Helghis, Newlonwards BT23 3XA.** Tel 0247 818191.

**Ballymena (BRC G13FFF)**—12 Sep (Annual rally, 12am Ballee High School, Ballymena), 1 Oct (AGM), 8pm. 70 Nursery Rd, Grace Hill, Ballymena. Sec G14HCN.

**Bangor (B&OARC G13XHO)**—4 Sep (AGM), 8pm, Bangor Rugby Club. Sec G14OCK, tel 0247 454049.

**Belfast (City of Belfast YMCA RC G16YM, G16YMC)**—26 Sep (AGM), 10am. Club Room, 4th floor, YMCA, Wellington Place, Belfast. Sec G16BJO, tel 0232 771951.

**Belfast (RSGB Group)**—16 Sep (AGM), 8pm. 90 Belmont Rd, Belfast. Details G16ATZ, tel 0232 795307.

**Doagh (East Antrim ARC G14KKK)**—From 9 Sep meetings are now held on the second Wednesday of each month. Sec G14BTG, tel 02313 49277.

**Gillford (Mid-Ulster ARC G13VFW)**—13 Sep (AGM), 3pm. The Gulde Hall, Castle Hill, Gillford, Co Down. Sec G11BIW, tel 07622 22855.

**Larne (L&DARS G14PHA)**—2 Sep (AGM), 8pm. Curran Bowling Club, Curran Rd, Larne. Sec G14CPP, tel 0574 75407.

**Lisburn (Lagan Valley ARS G14GTY)**—14 Sep (AGM), 8pm. Harmony Hill Art Centre, Harmony Hill, Lisburn. Sec G14TCS, tel 0846 662474.

**Londonderry (North-Weal of Ireland ARC G13CFH)**—7 Sep (Night on the air), 8pm. Prehen Municipal Boathouse, Victoria Rd, Londonderry. Sec G14OUN, tel 0504 84529.

**REGION 17—RR T Emery, G3KWU, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.** Tel 0703 812435.

**Andover (ARAC)**—2 Sep (DF hunt), 6 (Barbecue), 16 (Junk sale), 8pm. Wolverdene Club, Andover, Sec Sarah Allrit, tel 0264 56389.

**Beaingsloke (BARC)**—Sep ("Mnlll-element antennas", G2CPM), 5 Oct (AGM), 7.30pm. Forest Ring Community Centre, Sycamore Way, Beaingsloke, Sec G10OU, tel 0256 59644.

**Bourmemonth (BARS)**—4 Sep (Natter night), 18 (Night on the air), 8pm. Kinson Community Centre, Kinson, Bourmemonth. Sec G4DJG, tel 0202 626793.

**Easleigh (Ilchen Valley ARC)**—11 Sep (Visit by RSGB President, G4CHH), 25 ("Sterling cw with 50MHz in mind", G4YEE), 7.30pm. The Scout Hut, Brickfield La, Chandersford, Easleigh. Sec G11PQ, tel 0703 736784.

**Fareham (F&OARC)**—2, 16 Sep (Natter night), 9 (Demo and talk by Winchester Communications, G0EQX), 23 ("1.3 GHz high power linear amplifier", G6XHR), 7.30pm. Porchester Community Centre, Porchester, Herts. Sec G3CCB, tel Fareham 288139.

**Farnborough (F&DARS)**—9 Sep (Pre-egm discussion), 23 (Construction contest), 8pm. Railway Enthusiasts Club, Access Rd, off Hawley La, Farnborough. Details M C Gallius, The Paddock, Diamond Ridge, Camberley, Surrey GU15 4LB.

**Horndean (H&DARS)**—3 Sep (Return match with Rowner club), 1 Oct (AGM), 7.30pm. Murchison Hall, London Rd, Horndean. Sec G4RLE, tel 0705 755274.

**Isle of Wight (IOWARS)**—4 Sep ("The Hospital Broadcasting Association", G3XDC), 11 (Bring and buy sale), 18 ("Oscilloscopes—how they work and how to use them"), 25 ("Astronomy in relation to radio", G1RHU), 8pm. Unlly Hall, Woolon Bridge, Sec G4RGE, tel 0983 872620.

**Jersey (JARS)**—Fridays, 8pm, and Sundays, 11am. La Hocq Tower, St Clement, New sec GJ60ZB, tel 0534 83722.

**Liphook (Three Counties ARC)**—2 Sep (Construction night), 16 ("HADRABS contest group", G8APZ), 30 ("AMTOR and peckel radio", G4CJO), 8pm. Tiro Railway Hotel, Liphook. Details G4VKC, tel Liphook 723415.

**Locks Heath (Amateur Radio Computer Club)**—4 Sep ("HM Coastguard", talk by a member of the service), 8pm. Lockwood Centre, Centro Way, Locks Heath. Details G4NUB, tel Locks Heath 84914.

**Portsmouth Hill Repeater Group (GB3PH)**—For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.

Each June the Mid-Sussex Amateur Radio Society assemble at the Jack and Jill Windmills on the South Downs to celebrate their anniversary. This year was the 21st, and to mark it they operated the special event station GB5RV, in honour of their Life President, Louis Varney, G5RV. The photograph shows Louis, (l), chatting to club chairman, "Busler" Evans, G3ZZX. (photo G4WEH)





**New Forest Repeater Group (GB3NF)**—For information or to join the group and help support the repeater, contact G6DLJ, tel 0703 847754.

**Portland (SDRS)**—1 Sep ("Raynal", G3JAU), 7.30pm. The Pennsylvania Castle, Portland, Dorset. Sec G0FIT, tel Dorchester 67596.

**South Dorset Repeater Group (GB3SD, GB3DP)**—For information or to join the group and help support the repeater, please contact G3VPF.

**Trowbridge (T&DARC)**—2 Sep ("Weather forecasting", Bristol Met office), 16 (Natter night), 30 ("Line signalling system circa 100", G3BPE), 8pm. Territorial Army Centre, Blythsea Rd, Trowbridge, Sec G0GRI, tel 0380 830383.

**UK FM Southern Repeater Holding Group (GB3SN)**—For information or to join the group and help support the repeater please contact Mrs Jan Steele, tel Fleet 613311.

**Winchester (WARC)**—18 Sep (Junk sale), 8pm. Durngate House, Winchester, Sec G1XCT, tel Winchester 880605.

**REGION 18—RR Ian Gibbs G4GWB, 61, The Gables, Widdrington, Morpeth NE61 5QZ, Tel 0670 790090.**

**Hellon-le-Hole (Houghlon le Spring ARC G1NMD, G3NMD)**—Preparation for 1 Oct special event, G6BHF, Also Raynet event, Wednesdays, Hellonle-Hole Hotel, Helton, Sec G0ABF, tel 091-234 4673.

**Newcastle (Tyneside ARS G3ZDM)**—9 Sep ("RSGB and amateur radio", G4GWB), Scout Centre, Harbottle St, Byker, Newcastle, Sec G4KOT, tel 091-234 1148.

**Stockton (S&DARG G4XXG)**—Wednesdays, Billingham Community Centre, New sec G0EJX, tel 0642 555923.

**Sunderland (SARS G4LPK, G6BXJ)**—Members and visitors please note that the club no longer meets on Sunday mornings. The club is operating an "In club"

contest on 21MHz. Meetings Mondays and Thursdays. Sec G0ASM, tel 091-528 8079

**REGION 19—RR R J C Broadbent, G3AAJ, 94 Heron-gate Road, Wanslead Park, London E12 5EQ.**

**Cheshunt (C&DARC G4MGC)**—2, 16, 30 Sep (Natter night), 9 (RSGB), 23 ("Sep VSWR—the true story?"), 8pm. Church Rooms, Church Lane, Wormley, Herts. Secs G4VMR and G4VSL, tel 0920 84250 (evenings). Morse classes held. Club net on 144MHz 2000h.

**Chiswick (ABCARC)**—15 Sep ("My Trip to Borneo", G4ZJD), 7.30pm. Chiswick Town Hall, High Rd, Chiswick, W4, Sec G3GEH, tel 01-992 3778.

**Edgware (E&DRS)**—5, 6 Sep (SSB Field Day, Copthall), 10 (Quiz evening), 24 ("Modern developments in terrestrial broadcasting", Nick Davies, BBC). Community Centre, 145 Orange Hill Rd, Burnt Oak, Edgware, Sec G4IUZ, tel Hatfield 65707. Club net on 1,978kHz at 2200h bst.

**Stevenage (S&DARC)**—1 Sep (Test equipment forum), 15 (Talk by Raynet), 6 Oct (RAE classes start, 7.30), 8pm. Sitec Ltd, Ridgmont Park, Telford Ave, Stevenage, Details G0GTE, tel Stevenage 724991.

**St Albans (Verulam ARC)**—8 Sep (Informal), 22 ("Radio astronomy", G3XJE), 7.45pm. RAFA HQ, New Kent Rd, St Albans. Club nets held on Wednesdays 7.30pm on 145-350MHz, Sundays 10.30am on 3-522MHz. Details G4JKS, tel St Albans 59318.

**Welwyn and Hatfield (WHARC)**—7 Sep (Kite antennas), 8pm. Morse classes on Thursdays. Nets on Mondays, 8pm, on 145-375MHz, Details G4WLG, tel 0707 335162.

**Westminster (Civil Service ARS)**—7 Sep (Contest appraisal, G8GFF), 12.30pm. Operational lunchtimes on G1CSR and G3CSR. Civil Service Rec Centre,

Monck St, Westminster SW1. Sec G6IMM, tel 01-698 4437.

**REGION 20—C R Hollister, 34 Battersby Way, Henbury, Bristol BS10 7SU. Tel 0272 508451.**

**Bristol (BRSGBG)**—28 Sep (RSGB video presentation), 7.30pm. Small Lecture Theatre, Queens Bldg, University of Bristol, University Walk, Clifton, Bristol. Details G4SOQ, tel 0272 508451.

**Bristol (South Bristol ARC)**—2 Sep (Final briefing for Bristol rally, G4SOQ), 6 (Third Bristol rally—GB2BRR, G4SDQ), 7.30pm. Whichurch Folk House, East Dundry Rd, Bristol, Details G4RZY, tel 0272 834282.

**Cheltenham (CARA)**—4 Sep (Mini-project contest), 7.30pm. Stanion Room, Charlton Kings Library, Cheltenham, Glos. Details G4VXE, tel 0242 36723.

**Gloucester (GARS)**—2 Sep (AGM), 24 (Visit to Bulmers Cider, Hereford), 7.30pm. St John Ambulance HQ, Heathville Rd, Gloucester, Details G6AWT, tel 0452 504515.

**Mendip Repeater Group**—GB3WR 144MHz repeater, GB3UB and GB3VS 432MHz repeaters and GB3UT 1.3GHz tv repeater. Details c/o 191 Charlton Park, Midsomer Norton, Bath BA3 4BR.

**Portsmouth (Gordano ARG)**—24 Sep ("Amateur radio in Papua New Guinea, and the Bird of Paradise Award", G3MFL), 8pm. The Ship, Redcliffe Bay, Portsmouth. Details G6ETL, tel Nallsea 855316.

**Yeovil (Y&DARC)**—10 Sep ("The 14-1MHz beacons", G3MYM), 17 ("Don't be afraid of cw", G3GC), 24 (Natter night), 1 Oct ("Short dipole", G3MYM), 7.30pm. The Recreation Centre, Chillon Grove, Yeovil, Details G1MNM, tel 0935 79804.

Thanks to the Cheltenham Amateur Radio Association for the warm welcome extended during my recent visit.

RR20

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T5830S, AT230, TR7800 2m 1m with 14-chann memory, PPI37 13V pwr supply, all boxed, plus other bits and pieces E1000vno. C4ROF, tel: 0425 620692 evenings or w/ends.

10m MULTIMODE RIG, Tristar 747, 120-chann usb/lsw/ am/1m, 10W a/p, Freqs: 28.350-29.690 E85, G4ZMY, QTHR Hints, tel: 0705 467583 evenings only please.

TS711E 2m BASE, veire synth, dr 1rad, mic, vgc E695; Spectrum with quality datacorder, mint, free progs E75; FT23R mini 2m, spare nicad, csc, NC29 char, vgc E225, All boxed, buyers collect - cash. COEOL, QTHR Cheshire, tel: 0606 554857.

SATELLITE RX 10.9/11.7GHz var-audio bandwidth, video/edle a/p E150; Marconl rrg/psu combined 12V/15A, 24V/15A tx/rmr rated 28A E50; 2' and 4' dishes with 11GHz waveguide prime focuss feeds E50/E100; Sony wide-angle conversion lens for HVC3000 camera E40; Cesium C-mount macro lens, 25mm F1.4 E30; 70cm arriel HDMA8 E15; 2m satellite dish, pref A2/EL tripod, dx lab scalar feed, mount E500; Yaesu CPU-2500R 2m 3W/25W E130, G13MBG, QTHR tel: 0247 461946.

FDK MULTI 750E multimode 10W + Tono 100W 11ncr amp E300 the lot, will split. COCEO, QTHR East Barnet, tel: 01-368 5681 after 6.30pm Mon-Sat.

MIRAGE 3016 150W E120; HH25/144 11ncr 1W-25W E50; BM05 p/a T2A E50; complete C-whip 10-160 E35, L16kerd, tel: 05034 432.

OSCILLOSCOPE, Teleguipment D43 dual-beam with manual E50; Cifer Systems vdu PS502/224A0 with manual E50; 40A thyristors 500V RS 261-889 E5e; IBM Selectric golfball typewriter onlt with computer 1/Tape E100, C378U, QTHR, tel: Horsham 53432.

FT780 70cm multimode, prrft E350; SEM Transmatch 3.5-30MHz E65; SEM Transmatch vhf E25, both as new All evne, radle only used for 7 centerts. Richard, CLSD, QTHR, tel: 0942 714966.

TRIO T5830S+ at p330 E795; Icom IC271E E575, both mint condx, orig pkg, manuals etc. C4YRL, NOT QTHR tel: 0736 762159.

YAESU FT726R mint, 2m 70cm set beards, literally unused, gonr back hf, E1000; also Catenrics rty cote tc, needs attn E25; mint STSMC to E75; 100KC/s xtal shack standard E10, C3FPJ, QTHR, tel: 0364 52238 evenings.

TRIO TH201 25W 2m tcvr E165; TH401 70cm E170; TH41E 70cm walky with spare batts, dc-dc cvtr E155 G3XXN, tel: Werksep 0909 732131 or 730128.

COLLINS SJ4 RX, service manual, vgr E200 one, Tel: 0494 782533.

REALISTIC OFFERS FOR Tene 9100E, Selkesh GP250X, Mega monitor, PS20, FC902, Heath 181100 Treq counter, Dateng FL3, LAR omnimatch, Codar presslrtr, Trle T1st/mic, KW103, 13.8V SA Phihang, strllng obo decrased amateur's widow, G3CHN, QTHR.

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SILENT KEY SATE: FDK Multi-750XX, 2m, 20W, multimodr, mir, dc reblr, vgr E200. G8HW, QTHR, tel: 02372 74858.

TRIO TR2600, extended Treq range, soft cscr, spkr/mlr, mobile stand/rhgr, 2 batts, boxrd, Olfers? AOR AR-22 T40-150MHz slmlne synth rx, Internal nicads, chgr, heliccl, Olfers? Lockwood, G3XLL, QTHR, tel: Mel11s 596.

ALTRON 10m SLIMLINE MAST, gd condx, base post mount complete E220 ono; HFS vrrtrrl, gd ronds E35 ono, WANTED: 3-ele triband beam, must be gd condx, Deve, C4WBB, tel: Sheffield 465145.

CROTECH SCOPE 20MHz model 3031 E95; 50kohns per volt multimeter E8; MMC 144/28hp cvtr E72; AR40 controller unit E8, C4DSC, QTHR.

ICOM ICR7000 Discenr remoto speech, mint E800; Trle stn monitor SH-220 E200, Len, G0HUA (G15C1 QTHR), tel: 0322 63605.

MF VERTICAL CPS 3.5, 7, 14, 21, 42, new, only cscr ondcr, gnrulne rresen for sale E170; Welz SP-220 swr/pwr meter, new E50; SEM multi switch, new, crused, E17, C4UNM, QTHR, tel: 0983 402273.

MICROWAVE MODULES MH1432/144 tcvr, repeater shift, 10W a/p fm/ssb 432 to 435.6MHz, ex condx, drive directly with FT290 etc on low pwr E97, G3LBW, QTHR, tel: Hiddlesbrough 317547.

TRIO 9130 MULTIMODE, boxed as new E335; Yaesu FT230, vgc E160; 209RH with extras E175; Jenkins hand key E30; Icom 1050 T0FM E25; Trle TL120 E90, C4EHG, tel: 01-534 3460 evenings or 01-553 7308 d4ytime.

ICOM DESK/MIC ICSM6 E20, boxed never used; Kenwood low pass filter E15; Dror wavemeter E15; Kenwood headphones H5-6 E10; rotator KR400RC with extra brkt, h/duty pole and control box E100, hardly used; radio books various. C61MC, tel: 0702 335782

TRIO TH21E 2m handheld c/w PB21H h/duty nicad, 2 batt rhgr, E160; Tenna 13-ele 144MHz E29; Jaybeam LRI T44MHz collnear E20, C4GXL, QTHR Glos, tel: 0453 843207.

2m STN: Icom IC202S c/w handbook, whlp, mic, etc E115; Hira 108B 80W 2m 11ncr with preamp (glvrs 50W with IC202S) E70; 2m 8-ele Yagi with some leader E7; also cables to complete stn, C8T28, QTHR, tel: 0252 516503.

ICS CP-1 to with software for Apple 11/1E E150; Omega tcvr kit part assembled E125; Magcon 4m tcvr 00V06-40 PA 28MHz I.F. E100, G13TLI, QTHR, tel: 0247 71 756.

AR2002 VHF/UHF SCANNER E350; Icom 2BE fm 2m mobile E250; MHL T44-5 100W 2m 11ncr E100; SMC 10m 4W mobile tcvr E40, All items mint condx, orig boxes. C4TFS, QTHR, tel: 0553 775409.

HAM4 ROTATOR, CONTROLLER, never used E200; KDK 2015R 2m/1m/15W E100; Marconl Atlanta marine rx (haavy) E65; Hrethkit MW100 hi tcvr, RIT fitted, h/b psu E100, C4CKK, QTHR Sochport, tel: 0704 24700 evenings or w/ends.

SHACK CLEAR OUT: Teleguipment 043 D/beam scope E100; AV08 Mk3 E35; AVO DA114 dig brnch m/metr E25; Mrgger Insulation tester 1000V E40; Advance 15MHz counter/timer TCTIA E25; psu 35A, many Tratures E75; MHL144/30LS E40; R1155 tx/rmr c/s E5; Nomes CTX80/CVF80, assmbld and boxrd E20; OCRX80 E10; enamelled copper wire, any length/swg psa, WANTED: Bird Thruiler etc, hi low pwr, could exch for vhf/uhf elo, All prices one, prefer buyer collects, C4WUS, QTHR, tel: 0287 42596.

GOING QRT: FT101ZD, len, cw filter and FC901 etc E350; IC-251E filterd with mufek SLNA 144u preamp & ceax relay E300; FT790R E200; Dateng multimodr edle filter E50; Junkers morse key E25; KR400RC and KR500 rotators E75e; Polarphaser 11 2m E40; Polarphaser 11 70cm E50, Buyer pays carr, G2LL, QTHR Bexhill on Sre, tel: Conden (04243) 4645.

ROTATOR KR400RC, nrver used E100, WANTED: BBC-8 and rty/cw hardware/software, WHY? Graham, C4VUX, QTHR Wotford, tel: 0923 248331.

ONE WIRE AND WAVES PUBLICATION E2.50 incl p&p. WANTED: One Kenwood R1000 rx about E200, Weed, tel: Clerhan 378.

LOWE SRX30 rx E65, C4LOT, tel: Stallord 662884.

TRIO T5700 2m multimode c/w matching Vox unit, vgc 1n orig box and pkg E260, QTHR1, QTHR, tel: 061 494 2729 after 6pm please.

PSUs LINEAR 13.8V 40A E69; 100A T3.8V (switch mode) E50; all fully smoothrd etc etc. Several at each, all fully mkg, ran be pestrdr; Icom 1050 for 28MHz E25, C4XOX, tel: 0245 324555.

HQ1 MINIBEAM, ex condx, used 2yrs only E70, Beyer collects, C4XKO, tel: 0827 873093 evenings only.

ARMY C12, AY08MK5 E50, Manuals: AR88D, CRT00, BC348, R209, R210, 22SET, 52SET, Eddystone 730/4, all at E3e incl p&p, G3SZM, QTHR, tel: 0903 41810 after 8pm and w/ends.

SEM TRANSHATCH 160-10m, as new E40; Eddyston 390pF variable cap 2kV dc, unused, Ter etc (Jan 87 Rad Com) E10; matched pair genuine Toshiba 6JS6C valves, boxed E12, Stave, G3YKU, QTHR, tel: 0606 888277.

TRIO T5430S with 1m onlt, am filter, cw filter; 250r/s plus PS430 pwr supply E750; Hestler mobile antenne with cells for 80m/40m/20m/15m/10m E60, carr extra, R Middleton, 49 Welsley Resd, Stefford ST16 3XW.

SATELLITE TV spun alloy 1.8m dish 400-ch console, thr brst by Gen Inst, Nead Solidstate hf gen/cov or 107 line up with tcvr 6m or 2m, P/exch? Honey adj e/way, C14VQR, Frank, tel: 0504 883914 or 0504 882891 evenings, ask Ter caretaker.

OPERATING MANUAL AND TECHNICAL MANUAL for FTone E12; set of valves for FT102 E20; Cambridge cntenne noise brldge E10; SEM noise brldge E22; PW widbrnd amplifier E10, WANTED: FT480R, Sephten, T6 Bleanfenteln Avenue, London W12 7BL, Tel: 01-749 1454.

ALTRON 3-rla 4-band minibeam 6m/10m/15m/20m E70 ono, Beyer collects, Peter, C4YYO, QTHR, tel: 0538 702208.

YAESU FT401GX hf tcvr 160-10m excellent E250; Trlo TR9000 2m multimode E300; KW2000E hf tcvr 160-10m mstching psu/spkr, mint E200; Trle TR7730 2m/fm E200; Trle TR8400 70cm/1m E220; Kenwood pwr supplies PS30 E60, PS10 E30; MHL144/40 2m 11ncr with preamp E45; SEM Ertune etc 160-10m E75; SEM Transmatch etc 80-10m E60; Dalwe swr/pwr motrs CNG20A E50, CNG20 E25; Hi-mond mersr key E14; coex switchers 3-way E15; Dalwe 2-way E12; Icom CB1050HF E20; Fldrlity CB1000FX E20; 70cm 20-elr beam E15; 2m/70cm collnears, Olfers? All tested, gd condx with manuals/spare valves etc, professional test eqclp Hewlett-Packard ohm/voltmeter E30; Venner TS43436 dig freq counter E50, Prefr Inspection/collect. COGAR, Stallord, tel: 0785 211653 after 5pm.

ICOM ICR7000E scanning rx 25-2000MHz 99-memorles channels, bought nrw Feb 87, 1n mint condx, orig box with all manuals E850 ono, This receiver is still under mcker's guarantee, Tel: 0282 39874 anytime.

ECOYSTONE 770R Mk1 with manual E90, buyer collects OX-tv equpl, nrw and boxed, see for list, Jems, RS90512, 4 Longvlew Drive, Huyton, Liverpol L36 6EE.

HALLICRAFTER SUPER SKYR10ER 0.55/61MHz rx E30; Celesto vte 807 PA 3.5/28MHz tx E25; psu P039A 250V 6.3V E15 and E10; 2m 12V rx NR56VFI vte+9 xtals E45; Kry WR493 E5, COEZA, QTHR Brimsrombr, tel: 0453 883874.

FL50B+ FR50B YAESU SEPARATES 50W 1/p transcrive operation on 80m/40m/20m/15m/10m plus 160m receive only; 2.5kHz filter and rf attenuator fitted E85e or E150 the pr, Richard, C4FJC, QTHR Colchester tel: 0206 210154.



HORSE TUDOR SPEAKING MMS1 E75; MC-1400 2m/fm/25W H and SW L E120; KW E-zcr match 80m to 10m E30. G6MSE, OTHR, tel: 0625 611942.

RAYCOM 2m rf amp T5W o/p E35; Trio MC50 m/c E30; xtal calibrator 1MHz and 100kHz E10; oscilloscope Thander Leader nrm 5" LBD/STOB E80; Western vertical antenna OXGV 10/80m E50; 5EM Trasmatch 10/80 E50. G4HTX, OTHR, tel: 0780 63604.

HASCOM3 with 48k RAM and hand-built P10 E100; Genl G805 dual 40 track disk drive E90; Hascom2 net wkg, for spares, E10; RAM boards E20ea; rack mounting mono monitor E15. tel: Uxbridge (0895) 442012 evenings and w/ends.

TR10 T5530SP with cw narrow filter E750; Kenwood T5120S E550; Yacou FT209RH with headset and spare batt E250; Belcom Lirer2, tatty E50; Drake 14-4C rx w/s E70; KW Vanguard tx E30. Buyers collect or delivery extra. G4XBL, OTHR, tel: 0965 21553.

TR10 T5430S with fm unit, as new E850; Oalwa automatic atu 80m-10m E150; Icom IC290E 2m multimode TOW E400; Sata 10-100W linear with preamp E180; Icom IC490E 70cm multimode TOW E550. All ex condx, Tony, G6EPP, OTHR, tel: 038482 4773 evenings.

AR240 HANDHELD fully synthesised 2m txvr 800-chann spaced 5kHz 144-148MHz niceds rubber duck and chgr gmo E95 ono plus carr. G4FHH tel: 0278 784812

TR10 9130 2m/mode with mobile brkt, rarely used for transmitting, mlt E360; Adonis 503 base/m/c E35; MHL 144/30LS 1/amp E40; Amstrad 15T2 d/disk mofa with printer, modem, rrtelive M52000 games etc E750. All ono. G6JFK, OTHR, tel: 0604 49T627.

KENWOOD T5530S, vgc, fitted narrow ssb and cw filters plus MC50 m/c and new set spare valves E625 or p/exch for vhf equip. G4VZH, OTHR Worcester, tel: 0905 53027.

SAVE E471 Datong PCL cvtr, converts (tunable) 2m rig to all-band rx, 100kHz to 30MHz, mlt condx, E30. C4GHC, OTHR Torquay, tel: 0803 37050.

TR9000 144MHz multimode, m/c, manual, mtg/brkt E250; SEM Tranzmatch, atu E45; MHL T0-S 144MHz linear E100; SEM auto hf preamp E5. All gmo, offers considered. G4VJK, OTHR, tel: 0273 783556.

EPSON PX-8 portable computer with led display, c/w c/p/m, baale, Wordstar etc; Datong FLV2/3, MDE, DF, DF2, RF5-1 or any items of Rascal tactical radio equip, any condx considered, wanted in p/exch. Bob T20 Birmingham Road, Redditch, Worcs B97 6EP.

KENWOOD KENWOOD KENWOOD KENWOOD KENWOOD KENWOOD 15520 old faithful hf txvr cw filter, de lvrtr, vgc E300; T5770E 2m/70cm multimode TOW txvr, vgc E500. Reasor for sale buying new Kenwood. Bob Tel: York 425619 evenings. KENWOOD KENWOOD KENWOOD

TOWER, 60ft 3-section triangular steel tiltcover, 6-ele Hygal 1thunderbird hf, 6-ele quad 2m, 18-ele 2m Yagi and 21-ele X-Yagi elevated by Kenpro KR500 with 2m vertical 1600 ono with all coax. Can deliver 30miles radius Pils (extra). GTUJ2, OTHR, tel: 0202 695793.

IR2500 TR10 2m handheld c/w chgr E170; 3-way antenna switching system E50. WANTED: Icom 75TA hf; also 12V keyer. Dave, G4DGG, tel: 0235 20230.

MICROWAVE MODULES rty to tv cvtr, ex condx; Strphors-James rx atu; SEM audio filter with spkr, E200 the lot or will separate. CW4R2U, OTHR near Haverfordwest, tel: 0437 710544.

FT29DR Mk1, nicads, chgr, soft casr, helical, flexi-whip, manuals E240. Sale due to QRT. G6XHO, Sheffield, tel: 0742 339831 after 7pm.

ALUMAST 40ft tiltcover lattice tower with rotator, mounting plat ard Kenpro top bearing E200; Kenpro KR600RC rotator, nearly new, vgc E750, both ono or swap for 2m base multimode. Mike, G4KFK, HOT OTHR, tel: 0734 43T423 or Prestel 219994780.

FT69OR, Imaac E235 ono. G3G10, OTHR, tel: 01-567 6389.

OALWA ROTATOR Madr1 OR-7600R h/duty, ex condx E100 Art, G4GQYR, OTHR Aberdran, tel: 0224 494100 evrs.

PK64 COMMS ADAPTOR, (packrt, rty, Amcor, cwl for CB6M4 E275; R1000 CC rx E200; TR9130 2m multimode txvr E300; Spectrum plus 48k, games softwarr, magazines, VTX5000 Prestrl modem, RCB adaptor E70. Chris, G3TUX, tel: 0428 56255 daytime.

DRAKE SP75 speech processor new, boxed for TR7/TR7A E95; Mosley T03JR trap dipole 20/15/10, only 22ft long, unused E35. tel: 0602 609345.

TR10 T5510 TCVR for 3.5MHz to 28MHz, cw ssb with matching psu/spkr unit and operating manual E130. Buyer collects. G4HQA, OTHR, 5 Pine Close, Wetherby, West Yorkshire LS22 4XU, tel: Wetherby

Wetherby, West Yorkshire LS22 4XU, tel: Wetherby 65687.

YAESU FC700 ATU, vgc E85; T4 r/c MET, as new E25. GTUJ2, OTHR, tel: Shorene 3797.

STANDARD C120 handheld with nicads and carry casr, mint condx E160, buyers to collect or pay carr. G6JUL, OTHR, tel: 0734 594495.

YAESU FT70RR handheld 70cm txvr with chgr, soft casr and spkr/m/c E165. Paul, GOFUO, HOT OTHR, 10W tel: 0983 852682 after 6pm.

PRO30 HANDHELD SCANNER, memory scan, band search, priority chann, lockout rtc, 68-88, 108-136, 138-175, 380-520MHz, as nrm, boxed plus c/w pwr supply E130; Yarsu FRV7700C vhf conv 140-150, 150-160, T60-170, new, boxed E30. G4OBVF, OTHR, tel: 057 63 494.

TR9130 H/MODE, brkts, manual, boxed in flnr condx E350; FT101 80-10m 230/12V rx only past T2yrs, ex condx plus Europa "B" 2m txvr s/state rx valve 60W tx, manuals, both E350, GILCI, Bourne End, Bucks, tel: 26493.

NEC C0110E T60-10m 230/12V d/g readout usb/1sb, c/w am/rty/sstv 180W pap, used 11strning only past 3yrs, sparr valves, manual (rxch FT77, FT707) or E350. GILCI, Bourne End, Bucks, tel: 26493.

DRAKE MH2700 2kW matching network c/w manual E350 ono; Shure 444 m/c, hardly used E30 ono; typewriter keyboard for Spectrum computer 0k'tronics E25 ono, all in gd condx. G455X, OTHR tel: Rulsilp G30627.

HAM IV h/duty rotator, ex condx, c/w control and 100ft cable E200 ono; CD670 communication decoder, boxed, never used, see Lowe advert E250 ono; C3LIV Amcor rty/1facr for BBC E50. WANTED: Good solidstate storage scope, Tel: 0642 816608 evs.

CVTR5: one microwave modules 2m-10m E25; one 70cm-10m E25; 6-r/r 01scone aerial for vhf/uhf, ideal for scanners or cvtrs E12. All in rx condx and am open to reasonable offers. Stan, BR588840, Tamworth, tel: 0827 58004.

SWAP/SELL FT290R with m/c, nicads, chgr, carrying case, listen on 1/p and MH 30W amplifier with preamp plus 10fm converted CB rig for mobile hf txvr T5130S, T5120S, FT707, etc+ cash e/may or sell E350. Graham, G4VOE, OTHR, tel: 061-740 4126 anytime.

FT708R BOXED and c/w chgr, mint condx E125; spkr/m/c E75; spare nicad pack E15; IC2E with r/cad pack, chgr, handbook h/b dc regulator, mint condx E120; MHL144/30LS linear E50. G4UDF, HOT OTHR Wembley, tel: 01-902 5995.

YAESU FT757GX with m/c and handbook, boxed, mint condx E575. Buyer to inspect and collect. G4TCN, OTHR, tel: 01-897 3794.

APPLE2 Amcor/rty hardware and software, just needs to, E40; disk drive E35; 80-column card with font disk, boxed E35; Apple joystick E10. All genuine Applr spares, G4GQY, OTHR tel: 0482 860440 evenings.

JAYBEAM 2m T44MHz 8-elr crossed Yagi, vgc, vary light use only E20 ono, buyer collects. WANTED: HF vertical, WHY? G4YWI, OTHR Cumbria, tel: 09405 728

TOWER, 60ft BX1, motorised winch, HAM-M, Moseley Classic-CL-33 3-r/r beam, dismantled ready for delivery which could be arranged E450 ono; Anglian 2kW 11near E250 ono; Swan 350 E125 ono, Worcester area (near M5/Junct 5), G3LBS, tel: 052786 393 or D836-506 357 (24hr).

FT221/MUTEK E300; 4CX1000A new, offers? txfmr 3kV 1A with rectifiers and smoothing unit E50; Centronics 737 printer E80; AV08 Incl casr and nrm leads E40. Tel: 0822 66908.

KEHWOOD TH215E 144MHz handheld, latest modrl, nicads but no chgr E190; G-whip mobilr antenna, helical hf plus coils for 1f and base, 160-10m E35 G3150, G1rnnorstrr, tel: 028 575 532.

FT780R 50MHERKAMP 70cm multimode TOW o/p c/w mobilr mount, handbook, boxed as nrm E320; 70cm 50W T1near MHL432/50 E90. G6ICX, OTHR near Shrewsbury, tel: 0939 260157.

TR10 HANDHELDS 2m TR2600E 2 nicads E160; 70cm TR3600E 2 nicads E220; 572 bass chgr E30, boxed as nam. G4TOR, OTHR, tel: 0902 765374.

STANDARD RADIO AIRCRAFT atu 2-18MHz, twin roller coasters, manual and motor operated E35; smr bridge single meter E7. G3SZH, OTHR, tel: 0903 41810 after 8pm and w/ends.

KZRW 1kW/70cm 11near, fully-protected, metered psu, built to high standard E500; 4cx250 E275; 4cx350 E6; chimneys 75p; EHT rectifier and capacitor pcb 32ux3kV E18.50; capacitors 50,000uF

25V @ 20A E2. Chris Farman, G4GRF, OTHR, tel: 0582 68446 or 0442 3272 axtn 432 (warks).

FT1012D fan, dc, kltts for am, WARC, manuals, 11tblr used E400; 5100 computers and boards. WANTED: FT980/FT757/1C751, DFM to 500MHz; 50MHz modular for FT726; KR400/600. Allan, G3PYW, OTHR, tel: 0621 52041.

SILENT KEY SALE C3JEN: Trlo 5305P E500; AT230 C100 C30RT, OTHR, tel: Earls Colne 2164.

TANDY MICRD RADIO/CASSETTE nicads and chgr plus box. Swap for Oatorg mtrr or passibly Walz SP220/420 vsmr mtrr. Desperately require shortwave circuit board for Panasonic DR48/4800LBE Consider comp rx, must be cheap or WHY? Dave, C1XDK, tel: 0375 640275.

ICOM 251E fitted mutek, orig pkg and manuals, mlt E375; Pac-Com 200 packet controller E75; BBC computer E225; disk drive 40/BDY double-sided E75. Trl: Southend-on-Sea 552729.

FT101Z, ex condx, manual E370; Thro wattmtrr pwr/swr twin mtrrs 50-144+430MHz E50; Comp 70cm atu stn camera monitor txvr, all wkg. G3HL1, OTHR, tel: 0203 456128 evenings.

YACI 3-ELE HE tch, coax, rotator +cage h/duty, 45ft mast w/inch, prak frading wattmtrr 2kW; h/brrw 11near 1kW o/p; Sony 64k+ computr, new condx, reasonable offers about half new prlr, will haggle; T5130V +DFC230 controller E300. G3510 OTHR, tel: Kingslford 295924

YAESU FT225RD, mint E475; YR901 cw/rty reader with YK901 keyboard plus YHM-1 vidro monitor only E285; Y1000 monitor scope E770; KW107 Supermatch atu E95; G3LIV rty/Amcor tu with cable and ROMS E55, carr extra. Steve, G4P55, tel: 09T-410 8476 evenings.

KAYPRO2 COMPUTER w/perfect writer/sprlter/11lrr/calc/wordp/s/Wardstar+ manuals E350; HW100, h/b pau E90; 011vett1 JP10T printer E60; for spares HrathH14, Burroughs, printers E30ea; Colour Centa E20. All plus carr or buyer collects. C37IN, OTHR tel: 0473 724928.

FT-707, MIC, CW FILTER E350; HP415C for modulated signal measurement (Rad Com 1986, p699) E30; 12AVO 10/15/20m vert E30; Datong Woodpecker blanker E35. WANTED: prop-pitch motor. C35EK, OTHR, tel: 0235 31559.

ALTRON A06-20/3E 3-ele minibeam under 1yr old, in gd condx E150 or offer or exchange for 2m trans. CH4XRE, OTHR, tel: Forfar C46T9.

COE C045 h/d Bell rotator, brand new, unused E140; Drake HW25 all-band atu c/w balun, praline condx E115; three 12ft sections ex-WD tower, buyer collects, E100 ono. C4GLL, OTHR Bradford, tel: 0274 883969.

TR10 KEHWOOD T5520 txvr mtrs or 12V, 160 to 10m E300; Trlo AT200 atu/swr/pwr mtrr, mtrrs txvr E80. Both in ex condx. G3YYG, tel: 0442 61741.

T5-130S, PS-30, PSU, MC355 hand/m/c, YD148 Dynamile m/c, EC707 atu, YKBBC YK885N filters, manuals, all in orig pkg, ex condx E500; Lirer2 m/c psu E70; Pyr Cambridgr with extras, boot mount, psu E40. G4HRP, OTHR Lapworth, tel: 05643 2702.

ET29DR +mutek +m/c, Hot used on transmlt, vgc E230 Datong mtrr txvr E35. Southport, tel: 0704 38584

OALWA H/DUTY ROTATOR, p/srt controller 15m cablr E90; 30ft 2-section mast, tiltcover E40; HET 8-ele 2m Yagi, Diamond 2m 5/8 collnar E25pr; other bits and bobs, mobilr ants, guttrr mounts r/c. G1FET, OTHR, tel: 0602 845957.

KENWOOD R2000 latest modrl 100kes/30MHz ssb/cw am/fm 10-mmr/m/rts 240VAC c/w hardbook 12V lead, boxed E450 (11st price E637); Dawa CHW419 twin-nrrdlr atu, 15/30MHz E150 (11sted nE207) new, baxrd. WANTED: Sony 22001D rx. Offers? P/exch? Tel: Bristol 500742 anytime.

FRG770D, memory, new condx E265; Farguson vhs vidro rcdr, mechanical typc, vgc E95. Would rxh or p/exch for old wireless equip, bright emlttrr valves, xtal set etc. Tel: 0268 750985.

KATSUMI EKTSD electronic kryrr E70; Cybernet 10fm professional mod 7W E35; Ham international LAGOW tunrd 10fm variable 11near E30. GOOLP, OTHR, tel: D7375 53920.

30FT MAST ATTACHED TO CO COTTAGE. An Immac modern 3-dblr bed bungalow nr the picturesque village of Audlem in the southernmost tip of Cheshire. Private gdns large enough for 80m dipole overlook-ing miles of open country. Why not retire here? Sorry to leave it all behind. E60,000 to discern-ing amateur. G4GQC, tel: 0270 812020.

ICOM R7000 vhf/uhf communications rx, mint condx, reluctant sale E700. C4JJC, OTHR, tel: 0274 674462

SONY ICF-20010 WORLD BAND rx, as new, bergain et £225 ono, Ninfeld, East Sussex, tel: 0424 892057.

15830M hf tcvr, VFO230, SP230, all thrnn E850; SM220 with B58 pen display monitor/amp E325; FL21002 11mhz hf, used twice £100; AHT2 Commodore 64 software rty/cw/amtcr £170; 601t Westover wind-up/tlttcr with post mounting, buyer nollnts, bergain £375. All eqnlp immac. G4TVE, NOT QTHR, tel: 0675 65808.

YAESU F1301 solidstate mobile/base hf tcvr 160-10m ssb, em plus cw filter, 1sk, 10-200W p.e.p, m/c & manual £335; 1RS80 OMP100 printer, serial and parallel 1/p, c/w manual £80. Hithln, tel: 0462 813235/811930.

TEN-TEC ARCSY HF 1CVR, with psu, callibrator, audio 111tr, atel cw 111tr, mobile leads +Tented atu, ell vgn ln orig boxes £450; Yaeu FRG1 rx ext frnq nountar +tdntalls, monue, vgc £120 ono, fn orig box, hf beam 1B3 Mk2 £100 ono. G4CWE, tel: Milton Keynes S11129.

FT901R F111ED 2 and 4m £265; Irto 2000R gen/cov rx fltnd VC10 vhl cvtr £525. Will haggle. C4HKO, QTHR, tel: 0905 26410 anytime.

R1Y GEAR MICRODRIVE FOR SPECTRUM 48 with 1/face £30; JEP terminal unit £25; Scarab Nite2 filter unit £25; all brand new with programs end certlidge. tel: Little Haywood 881 488.

F1200 HF 1CVR, sab/cw/am 100W, 10-80m, ideal for beginner £110; Europa 2m tvtr £40. G4EZE, Newcastle, Stella, tel: 0182 632730.

FT9020M dc-dc cvtr plus 3 new bands £550 ono; FL-21002 as new £600 ono, plus all manuals. Jlm, G0BGR, QTHR, tel: 01-949 5549 after 6pm.

FT11, mint ln box QRP to 100W n/w m/c, few hours use, surplus to requirements £415. G3M0H, QTHR, tel: 0663 44087.

ICOM 271E, as new £600; 144-435MHz Thru-11m wettmeter £30; MHL 432/50W 11mhz £80; BHQ5 25A psu £100. All as new, real bargains! C4W6QA, QTHR, tel: 0918 358480.

FT101Z0, 1m, cw 111tr, FV1010M, FL21002, with box end manuals, full set of new spare valves, atu, kyor, and dummy load. Preclar no spills. C44PSE, QTHR, tel: 0294 62955.

SONY ICF2001 synthesised digital rx; 150kHz-30MHz am/cw/sab plus 76-108MHz 1m, v.sensitiva, mint condx £75 ono; Orce alow-scan tx/rx unit, mint condx £155 ono. G3TCO, QTHR Bristol, tel: 0272 681068.

155305 F111ED CW FILTER with OFC230 vfo MCS50 tess/m/c, all perfect, boxed condx £595 ono. C4SIX QTHR, tel: 0422 202520.

FT290 nlcds, case, little use, lyr old £215 ovno handheld F1209R3 spkr/mic £195; MC15 chgr £55; Jeybeam 4-wle, excellent £18; Tonne 9-nle, gd £12; AR40, gd £60; various Yeas accessories, sets of Red Coms, post 1918. Golng hf. Yatoley, tel: 0252 876271.

YAESU F1-109R 10cm handheld with FNB3, FNB4, spkr/mic, chgr £239; Yaeu FT-708R 70cm handheld with spkr/mic, chgr £149; Yaeu FT-290R 2m multimode with nlcds, chgr, mobiln brkt, W40 liner, mobile antenne £269. Brunn, C4WVX, QTHR, tel: 06286 64415.

## WANTED .....

P40 OR SIMILAR tiltover tower required. Must be in gd condx. John, RS90576, QTHR Southampton, tel: 0703 814210.

HARCONI FILTERS FOR H2542 rx maritlmn usb 2.7k cw 150Hz 300Hz 1500Hz for H2540 300Hz Identity H322797 also fsk dnmnd H32225301 and cerlrr H32225401 pcb and any info. Please check your junk yards. C3YFK, tel: 0743 884858.

F1767CX TCVR with or without options, must be mint cash weiting. SP102 ext spkr, Wolz or eqnel twln dial pwr swr meter. Howard, G1W02, tel: 0394 460 474.

70MHz TVTR HMT70/144 or similar, also tvtr or tvtr fr 50MHz and IC2KL 11mhz. Tel: 0534 54186 after 6pm.

BUY OR BORROW 10 PHOTOCOPY: monnal/circuits for Reel RA17L coms rx or info on alternative source C4B4JFZ, QTHR Stretthvnn, tel: 0357 21169 after 6pm

RACAL TA970H, TA4093, TA4044 or TA944 amplifier or any parts of, also interested in any other Racal

"Green" tactical items. Some items available for exch. FOR SALE: Lorga collection 0.3, Bartholomews aeronautical maps/cherts. Bob, 120 Birmingham Road Radditch, Worns B97 6EP.

XF30C CW FILTER for Yaeu FT101E. WANTED: 600Hz or 300Hz. Ne11, CIVLI, tel: Grevsmond 322066.

EARLY WIRELESS AND CRYSTAL SETS; particularly WW1 sets or parts, early valves, horn spkrs, bound volumes "Wireless World", catalogues, pre-war tv, also intrnsrd tinplate tralns and good hf tcvr. Jim Teylor, C4ERU, 5 Luther Road, Winton, Bournemouth, tel: 0202 510400.

YAFSU FT101Z0 AND MANUAL or considr Sommerkamp 101. G6KLO, QTHR Horloik, tel: 060 53 3951.

DATA AND OPERATING INSTRS for "Lelayette" tube end transitor tester, model TE-21, also servinn sheets on Mhrphy U604 valve wireless. Tom, G4IXNZ, tel: 0674 76503.

COLLINS S-LINE TX, KW204 tx, Hallicrafter M131 tx, PRN10 gdo KW2000 series psu, KW101, KW228 tunners. Immediate cash for any of the above ln gd condx. G0CCI, Cumbria, tel: 02289 635 anytime.

F1107 MOBILE MOUNTING BRK1. Martin, tel: 0936 501621 or 021-455 9165.

G8 RADIOS - Have you given up CB? Why not donate your set to CB for the Blind Scotland, regd cherty no 286044. C4OE1G. Send to PO Box no 8, Falkirk FK2 8YB. tel: 041 429 6921 9am-5pm Monday-Friday.

BBC-B AND RITY/CW hardware/software, complete package preferred but not essential. WHY? FOR SALE: KR400RC, new unused £100 ovno; also Alrmed 201 hi/gen 30kHz to 30MHz attenuator etc £35. G4VUX, QTHR Watford, tel: 0923 2248331 evos.

MARTINE SUICASE RADIO A Mk3 (B2 minor) and Hk123 snt or any other clandestine and resistance-type radios Incl modern for collection. Any condx welcome. Manuals and accessories are of interest. C4OFO, QTHR, tel: 01-949 2311.

F1101B WORKSHOP MANUAL. Tel: 050 785 591.

WHITE STICK OPERATOR URGENTLY SEEKS: Sony ICFM20L synthesised 1w/mw/vhl battery portable radio; also wooden box or a blanket chest, or travelling chest with brass corners/handles. Chris, G1FAZ, QTHR, tel: 021 421 5040 or allice 021 236 8831 natn 162.

FT101M, must be ln nfen condx; also F1101 tvtr 2 or 6. G4V0X, Frank, tel: 0504 883914 or 0504 882891 evenngs, ask for ceretaker.

YAESU FREQ COUNTER YC601B for F1101; also Heathkit 12" tv model CR-9900 for spars. C0CHM, QTHR, tel: 0202 880194.

OVERSEAS MEMBER REQUIRES FT101E/2 155305 etc. Limited access to Stirling - hence looking for non-wkg model. 011nrs to G3KKO, QTHR, tel: 0184 51635 evenngs or w/ends.

MUTEK FRONT-END FOR F1221R, any condx, wkg or not or any info on FT221R rx/tx mods. All nsts relundd. C8MYK, QTHR Birmingham tel: 021 430 4904

URGENTLY REQUIRED FOR COMET1 Group 2 16-ole tonnes, must be ln gd condx, your price paid. We will pay postage or will collect. G0CHI, QTHR Bognor Regis, tel: 0243 820363 after 5pm.

INFORMATION - source of purchase 1req counter for Yaeu FRG7 rx. Writo: 10 Carnarvon Road, West Bridglord, Nottingham NG2 6DE, tel: 0602 233648.

DAIMA 2060 LINEAR AMP circuit dleg, service instr. All expenses relundd. C4BLG, QTHR.

BELCOM LS202F sab/1m handheld, LA201 mobile console/11mhz, any other accessories, 144MHz quad antenne, any Racal tactical radio equip items, all wanted. I have Fpson PX-8 portable minro lor p/exch or will purchase. Bob, 120 Birmingham Road, Radditnh, Worns B97 6EP.

MANUAL/OPERATING INSTRS or photocopy of, prinn ogreed; Venner AMF International 1req nountnr No.1000F Mk2, VTS/72/2, handback No.VTS/14. G0CNZ, QTHR, tel: 091 477 2420 evenngs.

GERMAN WW2 EX-SERVICE EQUIP; radio/radar/navlgat parts, 11tnature, for museum purposes only, not KC; British WS18, 65, 66, R208 T1190, A067, 52ERT, RC37, 40, 56. Will pay cash or exch. Collecting. FOR SALE: Collins 517Y W/Hook. flit 028RO. R Otterated, Vejdsdmmn 5, DK-2840 Holtn, Danmerk.

BOOK "INSTRUMENTS OF DARKNESS", author Alfred Prino, to purchase. Ontolla please. C1CHK, tel: 0452 423908.

VALVE TESTER. I need a valve tester to check my growing collection of valve gear and would prnfr on AV0 bench modnl if available. G0HTR, nx-G6EPT,

OTMR, Tamworth, tel: 0821 898024 anytime.

HEATH HP-24 psu; valve 4D22 or 4032; Ton-lac Century 21. G3RF1, QTHR, Pottton, tel: 0767 260800.

ANY KIND OF USED 2m or hl rx for paraplegic swl who cannot ellord to buy gnr. A small payment could be made lor gear and postage. Contact G4CLT, Or Davn Newman, "Hnhwaven", Beveridge Lane, Bardon Hill, Loles LE6 21B.

FT1 ARCSY OR SIMILAR QRP tcvr, also homnbrow tvtrs for nw portable opnrtion. Anything considered. Steve, C0EVJ, QTHR, Midlands area, tel: 0543 251915 after 7.30pm.

SSB NARROW FILTER XF-B,2HSN for FT102, G4USF, QTHR tel: 0604 44322.

KOKUSAI MF-455-10CK mecheninel 111tr and xtals; also small Amerinan broadnest rx with lino cord, non-worker considered 11 complete; RCA 7360 beam mixer velvn wanted to complete project. G4LSA, QTHR, tel: 0185 14388.

FC102 ANTENNA TUNER, must be ln gd condx. G1CWF, QTHR, tel: 0946 820937 anytime.

158305 OR 155305P hl tcvr. Would consider comp stn Cesh waiting lor gd nqnlp. Olnk, C0HPM, Hampshire, tel: 01356 2511.

E00510NE BATTERY RX EB35 or EC series, prnlnrably gd condx, anything considered, your price and post paid. C4W4PU, QTHR, tel: 0382 552295.

F1101Z0 ln gd condx, £500 offered. G3LSO, QTHR, tel: 01-435 8331.

AOR2002 SCANNER, nash waiting. G4KOC, NOT QTHR, toll 0144 884244 or 0695 623315 NOT AFTER 10.30pm.

MANUAL FOR RF BRIDGE typn 1606-A made by General Radio, Concord, Meas; also quality hl 11mhz nslng 813s. G4RHI, QTHR Axminster, tel: 0291 32572.

30-40FT ALUMASI TOWER and 60ft Versatower or similar. G3FEV, QTHR Manchester, tel: 061-764 8845

R1415 ANQ PSU+ manual 11 possible to complete long overdue project. Would p/exch comp WS123 with 2 pwr supplies for a good one. Dnrak Sheen, G4CCW, QTHR, tel: 01-651 1410.

NEEDED FOR ORAKE TR7 SL1800 1800Hz 6db ssb 111ter; MN2100 2kW atu-pwr motor or Yaeu FC102; atus considered. Gd price pd lor vgc units with full manuals & boxed. C4W4RLP, QTHR, toll 0286 5322 evos

FT7075 OR F1175. Hay consider FT101 or FT71. Must be ln gwo. C3HIJ, QTHR, tel: 091-2113734 evenngs.

TR10 1L922 11EA1M 220 or similar 11mhz amplifier. C3JUB, QTHR, tel: 0604 401800.

QRP SSB 1CVR. Southport, tel: 0104 38584.

ATU, FC107, A1120, AT130 or similar. WHY? C0FWI, QTHR Matlock, Derby, tel: 0629 3503.

TO COMPLETE AUSTIN CHAMP RESTORATION; dc psu, supply unit Translortor rotary 24V lor C11-R210 plus other Lerkspur bits/pieces, "A" box etc, WS19 WS22 or similar or accessories, any condx. Jlm, C4XWD, Klddorminster, tel: 0562 3674 evenngs.

POCOM DECODER 2000 2010 8000. C3VX2, QTHR, tel: Maldenhead 27350.

15530, PA3 OC-OC adaptor, YN24A spkr/mic lor FT208R. C3EWH, QTHR, tel: 0392 52925.

NATIONAL COMPANY MALDEN orig catalogues, manuals, ES-£10; HRO loudspkr MCS, £10-£20; following HRO rack-mounting 1tons, loudspkr RFSM, £20-£30; nomlnod psu/spkr/coll-cntolnolr SPC, £40-£50; noll-cntolnolr HCRP, £10-£15; Japanese, German WW2 HRO noplms, £150; non-wkg National rxs. Tel: St Albans 39333.

TET HB335P hl triband beam. Hast bn ln gd condx. C3PVA, QTHR, tel: 01-646 3738 after 6.30pm.

ORAKE R-4C rx and accessories; MS-4, 4-NB. G3VZC, QTHR, Shrnmsbury, tel: 0743 56195 after 6pm.

**All Member's Ads  
received up to  
17 July have been  
included in this  
issue.**

## AMATEUR RADIO SOFTWARE

**RTTY** Transceive or receive only for 1) Spectrum, 2) VIC20 3) CBM 64 4) MSX(1) 5) Ix only for ZX81 (16K). Split Screen, Type Ahead Etc. Various Baud rates. Rx only uses full screen, 1) & 5) Require filter, 2) & 3) Needs starter terminal. 4) Uses tone demodulator.

Tx/Rx ... £9.00  
Rx only ... £7.00

**MORSE** Transceive for the Spectrum ... no interface ... £9.00  
Receive only for: Spectrum, ZX81 (16K), CBM 64, MSX, C16, VIC 20, BBC B, Dragon, Atari (400-600&XL) & Amstrad (464 & 6128) Sinclair needs no interface.

PROGRAMME ... £7.00  
INTERFACE ... £3.00

Tutor for Spectrum or MSX(1) Beginner to test & beyond. Very comprehensive programme £5.00

**SSTV** Transceive or receive only for the Spectrum.  
Also design programme. Picture stores for Tx or Rx (8 on 48K or 40 on 128K). 8 text stores etc. etc.  
No interface required.

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Rx only ... £7.00  
Design ... £11.00

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## CPL ELECTRONICS PRACTICAL WIRELESS KITS

				TRANSISTORS		MICROPROCESSORS	
Downing Freq to Voltage Converter	June 87	18.70					
Sine Tone Oscillator	June 87	9.80	BC108	14	TP41A	40	155
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Woodstock Short Wave Converter	March 87	26.50	BC108	14	VN100M	80	141C
Masthead Preamp for 144MHz	Feb 87	38.30	BC108	14	VN100M	78	CA358
Westbury Basic Webulator	Jan 87	18.50	BC108	14	TP4300	19	CA3140T
High Z Metal Voltmeter	Dec 86	24.50	BC108	14	TP4300	19	CA3140T
Low VLF Converter	Nov 86	14.20	BC108	14	TP4300	19	CA3140T
Active Antenna	Nov 86	17.80	BC108	14	TP4300	19	CA3140T
Automatic Nicad Charger	Oct 86	18.20	BC108	14	TP4300	19	CA3140T
Simple 50MHz Converter	Sept 86	21.50	BC108	14	TP4300	19	CA3140T
Attn Parametric Filter	May 86	49.30	BC108	14	TP4300	19	CA3140T
Moon 2.50MHz Transverter (144MHz IF)	April 86	43.30	BC108	14	TP4300	19	CA3140T
Rain/Moisture Meter (No Case)	Jan 86	31.85	BC108	14	TP4300	19	CA3140T
Two Tone Oscillator	Dec 85	21.30	BC108	14	TP4300	19	CA3140T
Moon 50MHz Transverter (28MHz IF)	Oct 85	43.30	BC108	14	TP4300	19	CA3140T
Capacitance Meter	Oct 85	21.30	BC108	14	TP4300	19	CA3140T
Fel Dip Oscillator	Oct 85	19.90	BC108	14	TP4300	19	CA3140T
Add On BRD			BC108	14	TP4300	19	CA3140T
(Inc CB94 - Optional Comps)	Aug 85	12.95	BC108	14	TP4300	19	CA3140T
Triambric Keyer	Feb 85	18.45	BC108	14	TP4300	19	CA3140T
Morse sending Trainer	July 84	12.00	BC108	14	TP4300	19	CA3140T
Auto Notch Filter	June 84	25.90	BC108	14	TP4300	19	CA3140T
Morse Practice Oscillator	Jan 82	9.20	BC108	14	TP4300	19	CA3140T

PRICES DO NOT INCLUDE VAT, WHICH SHOULD BE ADDED TO THE TOTAL ORDER VALUE AND P&P CHARGES. P&P - 70p UNLESS SPECIFIED. ARTICLE REPRINTS 50p (IF REQUIRED). ALL KITS ARE COMPLETE (UNLESS BATTERIES). UNLESS SPECIFIED INCLUDING PCB, CASE, ALL COMPONENTS, CONNEXIONS AND HARDWARE. ALL COMPONENTS ARE NEW AND TO FULL SPECIFICATION. CHIQUE, P.O. OR ACCESS TO

CPL ELECTRONICS, Dept R, 8 Southdean Close, Hemlington, Middlesbrough, TS8 9HE TEL: 0642 551127.

Other kits are available plus a wide range of transmitters etc. ACCESS, MAIL OR TELEPHONE ORDERS WILL COME FREE PRICE LIST ON REQUEST.



## ANTENNA NOISE BRIDGE

LOSING DX? Not getting out?

CHECK that your ANTENNA is WORKING properly. MEASURE resonance 1-160MHz and radiation resistance 2-1000 ohms, get ANSWERS and MORE DX.

ALSO measure RF resistance and hence Q of loading coils, phasing lines, preamplifier matching or use as a noise generator.

ONLY £26.20, fun-to-build kit (ready-made to order) includes ALL parts, CASE, pcb, pre-wound transformer, by-return postage (Europe same, Giro 21.923.4000) and FREE "Kit News", send away TODAY.

CAMBRIDGE KITS

45 (RW) Old School Lane, Milton, Cambridge

## TX - 3 RTTY/CW/ASCII TRANSCIVE

The high performance, low cost system

Split-screen, type-ahead operation, receive screen unwrap, 24 large memories, clock, review store, callsign capture, RTTY auto CR/LF, CW software filtering and much more. Uses interface or T.U. BBC-B/Master and CBM64 tape £20, disc £22. SPECTRUM tape £35 inc. adapter board. For VIC20 we have our RTTY/CW transceive program. Tape £20.

## RX - 4 RTTY/CW/SSTV/AMTOR RECEIVE

This is still a best-selling program and it's easy to see why. Superb performance on 4 modes, switch modes at a keypress to catch all the action. Text and picture store with dump to screen, printer or tape/disc. An essential piece of software for trawling the bands. Uses interface. BBC-B/Master, CBM64 tape £25, disc £27. VIC20 tape £25. SPECTRUM tape £40 inc. adapter board. The SPECTRUM software-only version (input to EAR socket) is still available £25.

**TIF1 INTERFACE** Perfect for TX3 and RX4, it has 2-stage RTTY and CW filters and computer noise reduction for excellent reception. Transmit outputs for MIC, PTT and KEY. Kit £15 (assembled PCB + cables, connectors) or ready-made £25, boxed with all connections. Extra MIC leads for extra rigs £3 each, State rig(s).

**WORLD AND UK/EUROPE MAP LOCATOR** Maps, great circles, distances, bearings, contest scores. Lat/long, locators, NGR, hundreds of placenames. BBC-B/Master, ELECTRON ONLY, Tape £10.

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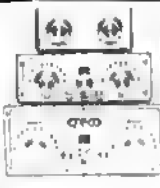
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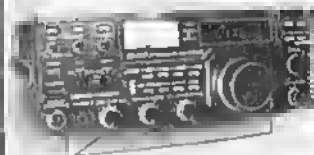


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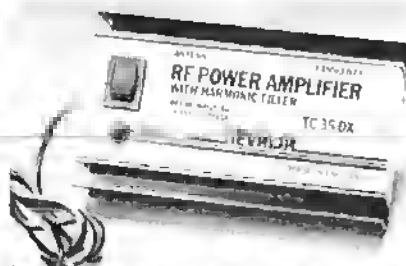
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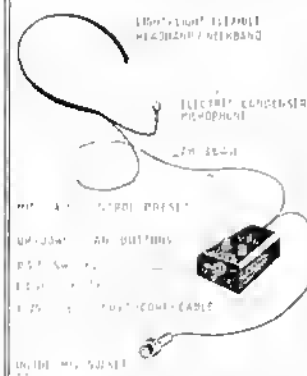
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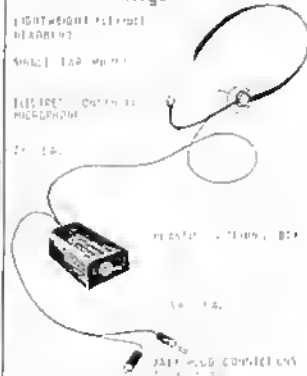
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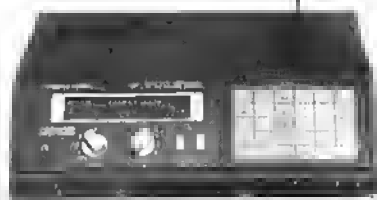
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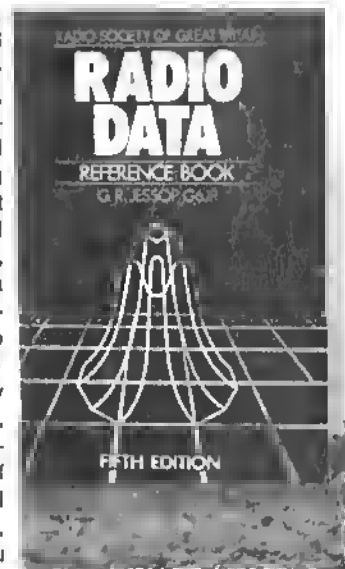


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